

A VETERAN-OWNED
SMALL BUSINESS

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March 12, 2015

Mr. Bradley Killian, Director
Harford County Planning & Zoning
220 South Main Street
Bel Air, Maryland 21014

RE: Walmart – Bel Air
Harford County, Maryland
SHA Tracking No. 12APHA019XX
Our Job No: 2011-0306

Dear Mr. Killian:

Based on our meeting on February 20, 2015, we are pleased to resubmit this Traffic Impact Analysis Addendum to determine the impacts of a new access along MD 924 from the proposed Walmart Development. As part of this analysis, we prepared a comparison of the different impacts to the key intersections in the vicinity of the Walmart Development based on a right in/right out and a full movement access along MD 924.

It is important to discuss the submittal of the Walmart Traffic Impact Analysis dated August 24, 2012 and submitted with the Site Plan on September 14, 2012.

- This initial submittal included the analysis of a full movement access along MD 924 directly across from Bright Oaks Drive.
- Before Harford County and the Maryland State Highway Administration (SHA) finished the review of the initial Traffic Impact Analysis, Harford County Council requested the Maryland State Highway Administration to deny certain access to MD 924 proposed in site plans submitted on September 14th, 2012 to the Harford County Department of Planning and Zoning for consideration (Resolution Number 26-12 dated October 2, 2012).
- At the Development Advisory Committee Meeting on October 17, 2012, the SHA requested additional analyses based on a “no access to MD 924” scenario based on the request from the Harford County Council.
- SHA and Harford County comments based on the initial analysis were presented to the Walmart Development Team on October 16, 2012 and October 26, 2012, respectively.

- Over the past two plus years, Harford County and SHA have collectively asked us to analyze over 18 intersections, system-wide network impacts, and multiple other traffic analyses/scenarios. This work has been reviewed extensively by all parties over the past two plus years. Ultimately, access off MD 924 was revisited (as requested by the applicant and Harford County) because it is a viable solution to address the traffic needs for the area.
- As mentioned in the SHA Letter to Harford County, dated January 21, 2015, a proposed access on MD 924 provides a transportation benefit to the overall roadway network because of the redundancy it creates in the roadway network, which gives traffic multiple options for movement. The results are expected to help the roadway network operate in a safe and more efficient manner.

Based on this last bullet item, we believe it is necessary to compare both the right in/right out scenario and the full movement access scenario to assist the agencies in determining the best solution for the residents of Harford County.

As requested by Harford County, trip distribution information was submitted for review on February 20, 2015. Harford County approved the trip distribution information with a slight modification on February 24, 2015. The addition of a right in/right out along MD 924 impacts the following five (5) intersections which is the basis of this addendum to the Traffic Impact Analysis:

1. Plumtree Road @ Blue Spruce Drive;
2. MD 924 @ Plumtree Road;
3. MD 924 @ Bright Oaks Drive;
4. MD 924 @ Bel Air South Parkway; and
5. Bel Air South Parkway @ Blue Spruce Drive.

Please note that the right in/right out impacts the Walmart Development access points along Blue Spruce Drive and those impacts will be addressed in Appendix B.

INTERSECTION ANALYSIS RESULTS

The attached Exhibits 1 through 5 detail the previously approved trip generation and trip distribution for the proposed Walmart Development. Exhibit 6 details the Critical Lane Volume (CLV) Results per the SHA Guidelines. As shown on Exhibit 6 under both scenarios, all intersections are projected to have acceptable levels of service. Table 1 below details the intersections that will have better levels of service with a full movement access at MD 924 @ Bright Oaks Drive instead of a right in/right out based on the mitigation outlined in Exhibits 9 and 10.

TABLE 1 (CLV Results) – Intersections with Better/Same LOS with a full movement access along MD 924

INTERSECTIONS	AM	PM	SATURDAY
Plumtree Road @ Blue Spruce Drive	X	X	X
MD 924 @ Plumtree Road	X	X	X
MD 924 @ Bright Oaks Drive		X	
MD 924 @ Bel Air South Parkway	X	X	X
Bel Air South Parkway @ Blue Spruce Drive	X		X
TOTALS	4 of 5	4 of 5	4 of 5

Note: The three (3) intersections that are not better are still LOS A

Exhibit 7 details the Synchro Analysis (HCM) Results as required per Harford County Guidelines. As shown on Exhibit 7 under both scenarios, all intersections are projected to have acceptable levels of service. Table 2 below details the intersections that will have better levels of service with a full movement access at MD 924 @ Bright Oaks Drive instead of a right in/right out.

TABLE 2 (SYNCHRO Results) – Intersections with Better/Same (within 1 second) LOS with a full movement access along MD 924

INTERSECTIONS	AM	PM	SATURDAY
Plumtree Road @ Blue Spruce Drive		X	X
MD 924 @ Plumtree Road	X	X	X
MD 924 @ Bright Oaks Drive			
MD 924 @ Bel Air South Parkway	X	X	X
Bel Air South Parkway @ Blue Spruce Drive		X	X
TOTALS	2 of 5	4 of 5	4 of 5

Note: MD 924 @ Bright Oaks Drive/Full Movement Site Access is still LOS A under these conditions and the other intersections change by less than 0.5 seconds per vehicle

Therefore, based on these results, the LOS improves at these five (5) intersections in 22 of the 30 cases when compared to the right in/right out scenario. And in the eight (8) cases where there is a level of service decrease, the LOS results are still either LOS A or a minimal change in LOS.

QUEUING ANALYSIS RESULTS

As shown on Exhibit 8 under both scenarios, queuing results were provided for movements at all intersections. Table 3 below details the number of movements at the intersections that will have better queuing results or a negligible difference with a full movement access at MD 924 @ Bright Oaks Drive instead of a right in/right out based on the mitigation outlined in Exhibits 9 and 10.

TABLE 3 (Queue Results) – Movements with Better or Negligible Queue (less than 1 vehicle difference – 25 feet) with a full movement access along MD 924

INTERSECTIONS	AM	PM	SATURDAY
Plumtree Road @ Blue Spruce Drive	4 of 4	4 of 4	4 of 4
MD 924 @ Plumtree Road	6 of 6	6 of 6	6 of 6
MD 924 @ Bright Oaks Drive	3 of 3	3 of 3	3 of 3
MD 924 @ Bel Air South Parkway	7 of 7	7 of 7	6 of 7
Bel Air South Parkway @ Blue Spruce Drive	4 of 4	4 of 4	4 of 4
TOTALS	24 of 24	24 of 24	23 of 24

Table 4 below details the number of movements at the intersections that will have better queuing results only of more than 1 vehicle difference with a full movement access at MD 924 @ Bright Oaks Drive instead of a right in/right out based on the mitigation outlined in Exhibits 9 and 10.

TABLE 4 (Queue Results) – Movements with Better Queuing (more than 1 vehicle difference - 25 feet) with a full movement access along MD 924

INTERSECTIONS	AM	PM	SATURDAY
Plumtree Road @ Blue Spruce Drive	0 of 4	2 of 4	2 of 4
MD 924 @ Plumtree Road	1 of 6	3 of 6	2 of 6
MD 924 @ Bright Oaks Drive	3 of 3	3 of 3	3 of 3
MD 924 @ Bel Air South Parkway	0 of 7	1 of 7	4 of 7
Bel Air South Parkway @ Blue Spruce Drive	0 of 4	3 of 4	0 of 4
TOTALS	4 of 24	12 of 24	11 of 24

Based on these tables, it is clear that the queuing results are much better with a full movement access along MD 924 compared to the right in/right out. Of the 24 movements analyzed and compared in the three (3) time periods, only 1 movement is improved with the right in/right out only access along MD 924 while 27 movements are improved during the same time periods with the full movement access.

ACCESS ALONG BLUE SPRUCE DRIVE

Also attached to this letter in the Appendix are access analyses along Blue Spruce Drive. For this analysis, we assume the same two access points for Walmart along Blue Spruce Drive (there is a 3rd just north of the building but we believe that it will be underutilized, so we assumed all traffic would use the other two access points for a worst case) and we assumed three (3) access points for the two pad sites on the west side of the property. Analyses were also conducted for both the full movement and right in/right out scenarios. Based on both of these scenarios, all of these intersections are projected to operate at acceptable levels of service (without a roundabout for the four-legged intersection). It should also be noted that all of these intersections work better with a full movement access along MD 924.

CONCLUSIONS

It is clear, based on the data and analyses presented in this addendum that the full movement access for Walmart along MD 924 is the best alternative for the residents of Harford County. With a full movement access instead of a right in/right out only access, the LOS based on CLV is improved by 80%, the LOS based on Synchro (HCM) is improved by 67%, and queuing is improved by 38% (these percentages do not include the positive impacts to the site access points along Blue Spruce Drive). Even though a right in/right out scenario is better than no access along MD 924, it still fails in comparison to the full movement access results.

We agree with the SHA Letter to Harford County dated January 21, 2015 and would further add that a full movement access on MD 924 provides more of a transportation benefit to the overall roadway network because of the redundancy it creates in the roadway network, which gives traffic multiple options for movement. The results are expected to help the roadway network operate in a safe and more efficient manner.

Sincerely,

A handwritten signature in black ink that reads "Joseph J. Caloggero". The signature is written in a cursive style with a long horizontal flourish extending to the right.

Joseph Caloggero, P.E., PTOE, PTP
Vice President

JJC/clg

(F:\2011\2011-0306\wp\Traffic Impact Analysis Addendum.docx)

TRIP GENERATION RATES

LAND USE	FORMULA	DISTRIBUTION (IN/OUT)
Free-Standing Discount Superstore (ksf, ITE-813)		
Morning Trips = 1.67 x ksf		56/44
Evening Trips = 4.61 x ksf		49/51
Midday Sat. Trips = 5.64 x ksf		50/50
High Turnover (Sit-Down) Rest. (ksf, ITE-932)		
Morning Trips = 11.52 x ksf		52/48
Evening Trips = 11.15 x ksf		59/41
Midday Sat. Trips = 20.00 x ksf		53/47

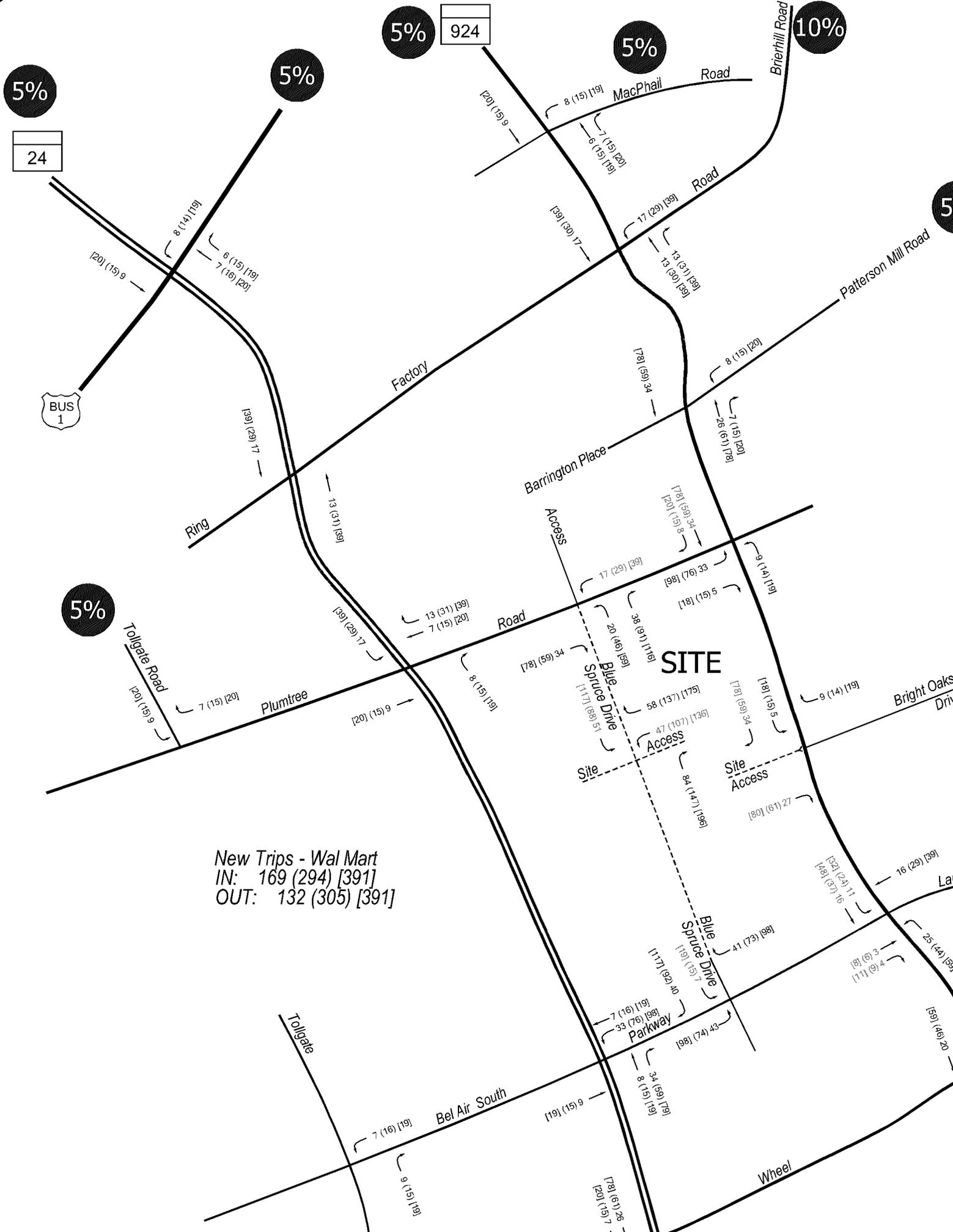
TRIP GENERATION TOTALS

	MORNING PEAK HOUR			EVENING PEAK HOUR			SAT. MIDDAY PEAK HOUR			ADT			
	IN	OUT	TOTAL	IN	OUT	TOTAL	IN	OUT	TOTAL				
Wal-Mart Supercenter- South Bel Air													
189,748 sq.ft. Free-Standing Discount Superstore (Lot 1)	178	139	317	429	446	875	535	535	1070	9630			
Less 5% Internal Trips	-9	-7	-16	-21	-22	-43	-27	-27	-54	-482			
External Trips	169	132	301	408	424	832	508	508	1,016	9,148			
20% for ADT Pass-by Trips (28%, 23%)				-114	-119	-233	-117	-117	-234	-1,830			
Net New Trips	169	132	301	294	305	599	391	391	782	7,318			
16,000 sq.ft. High Turnover (Sit-Down) Rest. (Lot 3)	96	88	184	105	73	178	119	106	225	2034			
Less 5% Internal Trips	-5	-4	-9	-5	-4	-9	-6	-5	-11	-102			
External Trips	91	84	175	100	69	169	113	101	214	1,932			
20% for ADT Pass-by Trips (43%, 43%)				-43	-30	-73	-49	-43	-92	-386			
Net New Trips	91	84	175	57	39	96	64	58	122	1,546			
Total	Pass-by Trips			0	0	0	157	149	306	166	160	326	2,216
	Net New Trips			260	216	476	351	344	695	455	449	904	8,864



Note: 1. Trip generation rates and pass-by rates derived from ITE Trip Generation, 8th Edition, 2008 and ITE Trip Generation Handbook, Second Edition.
 2. 5% per use internal trips are projected based on Harford County Government.

EXHIBIT 1
 TRIP GENERATION RATES AND TOTALS
 FOR SUBJECT SITE
 WITH REDUCED PAD SITES



New Trips - Wal Mart
 IN: 169 (294) [391]
 OUT: 132 (305) [391]

924

5%

24

BUS 1

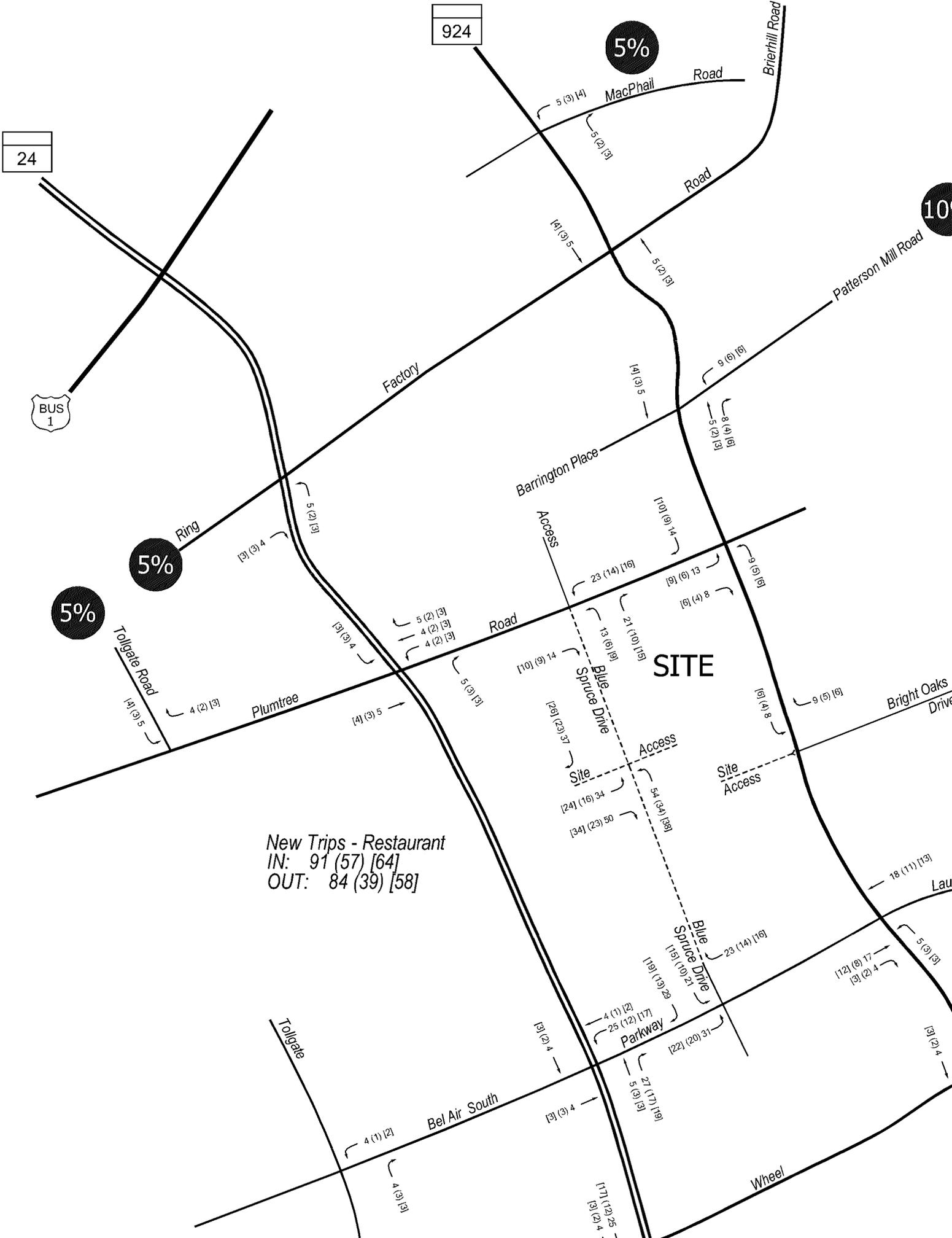
10

5%

5%

SITE

New Trips - Restaurant
IN: 91 (57) [64]
OUT: 84 (39) [58]



5 (3) [4]
5 (2) [3]

141 (9) 5

5 (2) [3]

141 (9) 5

9 (6) [6]
8 (4) [6]
5 (2) [3]

5 (2) [3]
131 (9) 4

5 (2) [3]
4 (2) [3]
4 (2) [3]

1101 (9) 14
1261 (23) 37

23 (14) [16]
13 (6) [9]
21 (10) [15]

1101 (9) 14
1101 (9) 14
9 (6) [6]
161 (4) 8

9 (6) [6]
161 (4) 8

9 (6) [6]

241 (16) 34
341 (23) 50

54 (34) [38]

Site Access

18 (11) [13]

121 (8) 17
131 (2) 4

4 (1) [2]
25 (12) [17]

23 (14) [16]
1191 (19) 28
1151 (10) 21

1221 (20) 31

131 (2) 4
131 (2) 4

27 (17) [19]
5 (3) [3]

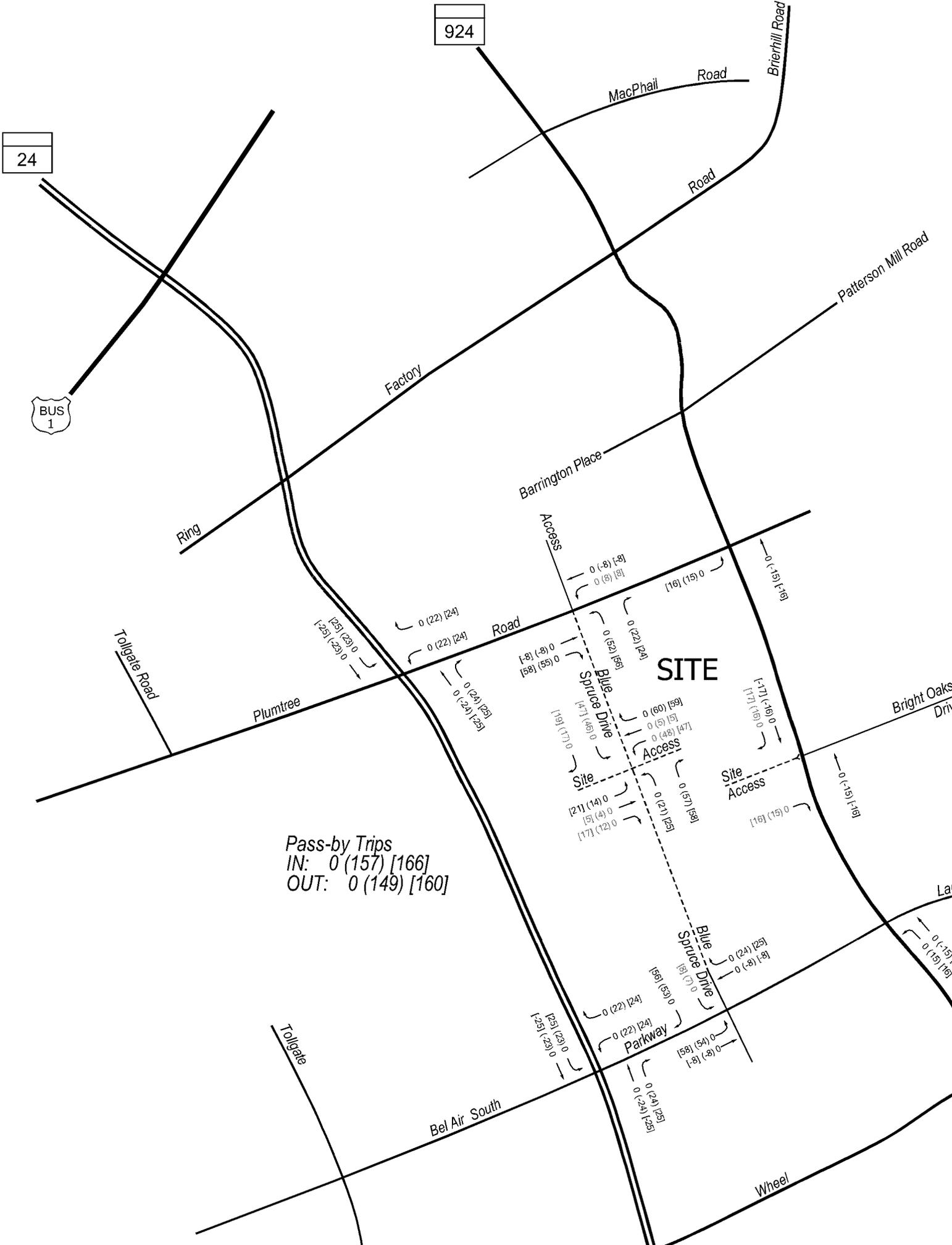
4 (1) [2]
4 (3) [3]

1171 (12) 25
1191 (2) 4

131 (2) 4

924

24



Pass-by Trips
IN: 0 (157) [166]
OUT: 0 (149) [160]

SITE

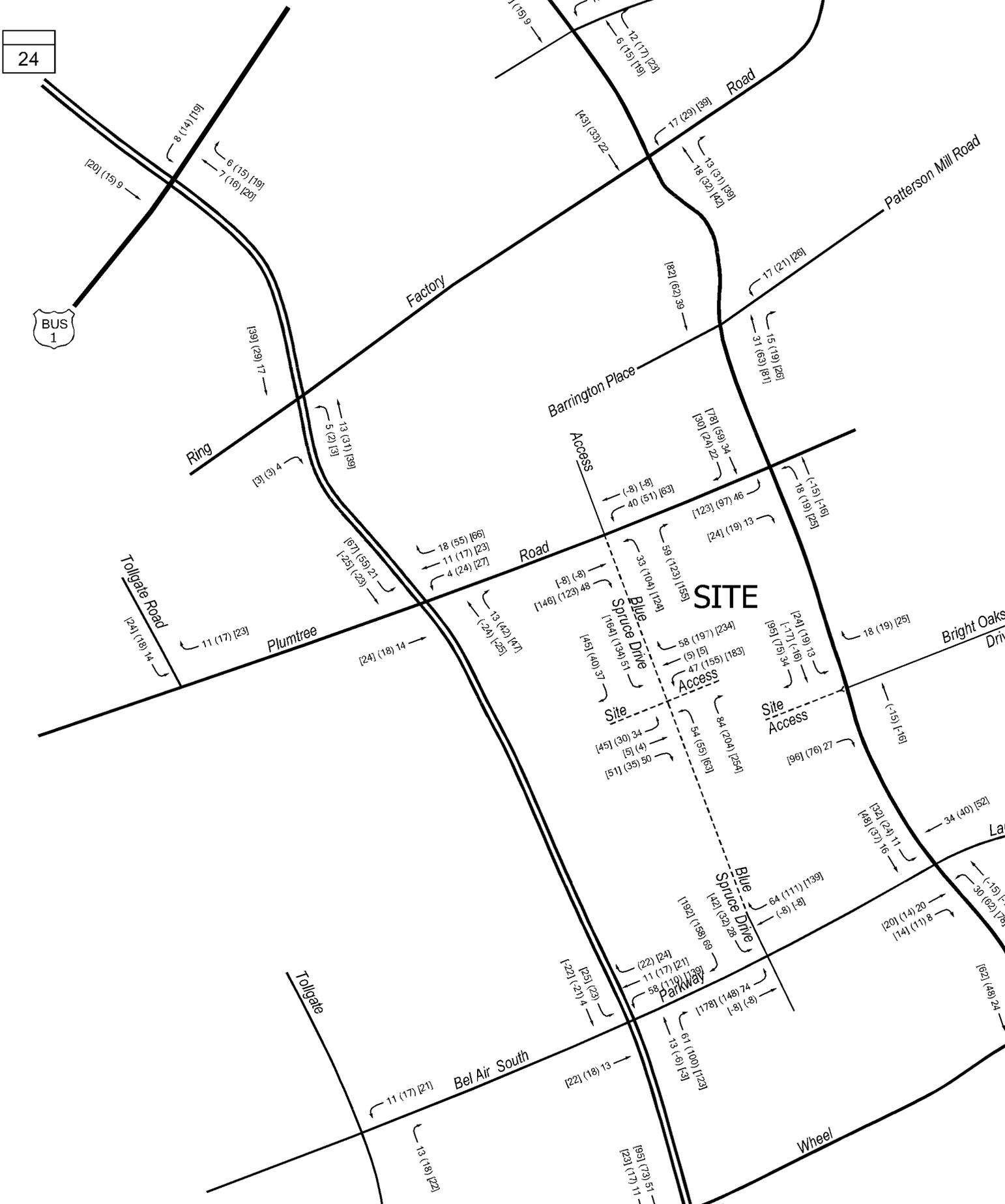
Site

Site Access

Parkway

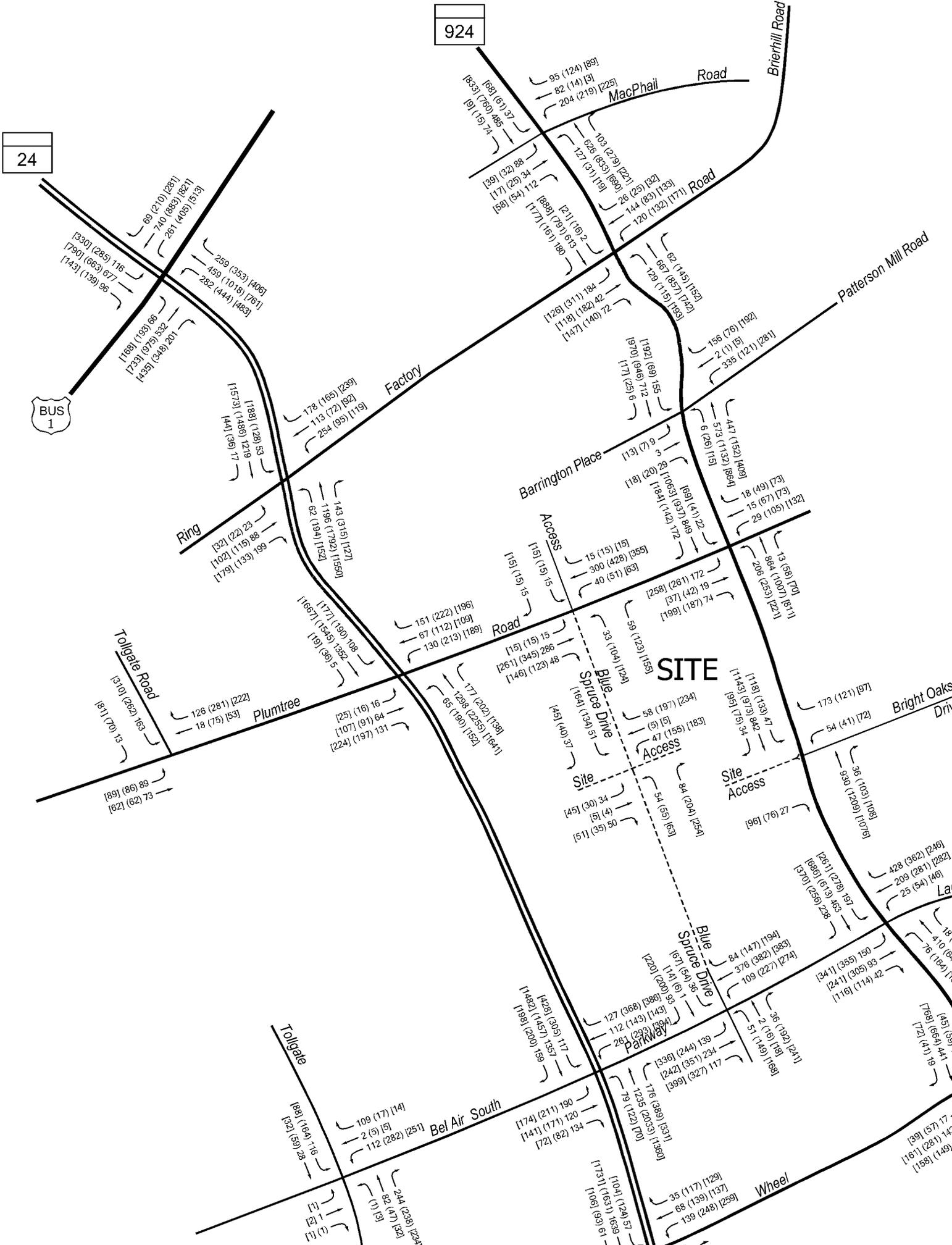
924

24



924

24



SITE

Access

Site

Site Access

Blue Spruce Drive

Blue Spruce Drive

Parkway

Wheel

Bel Air South

Tollgate

Tollgate Road

Plumtree

Ring

Factory

Barrington Place

Access

Road

Blue Spruce Drive

Blue Spruce Drive

Site

Site Access

Bright Oaks Drive

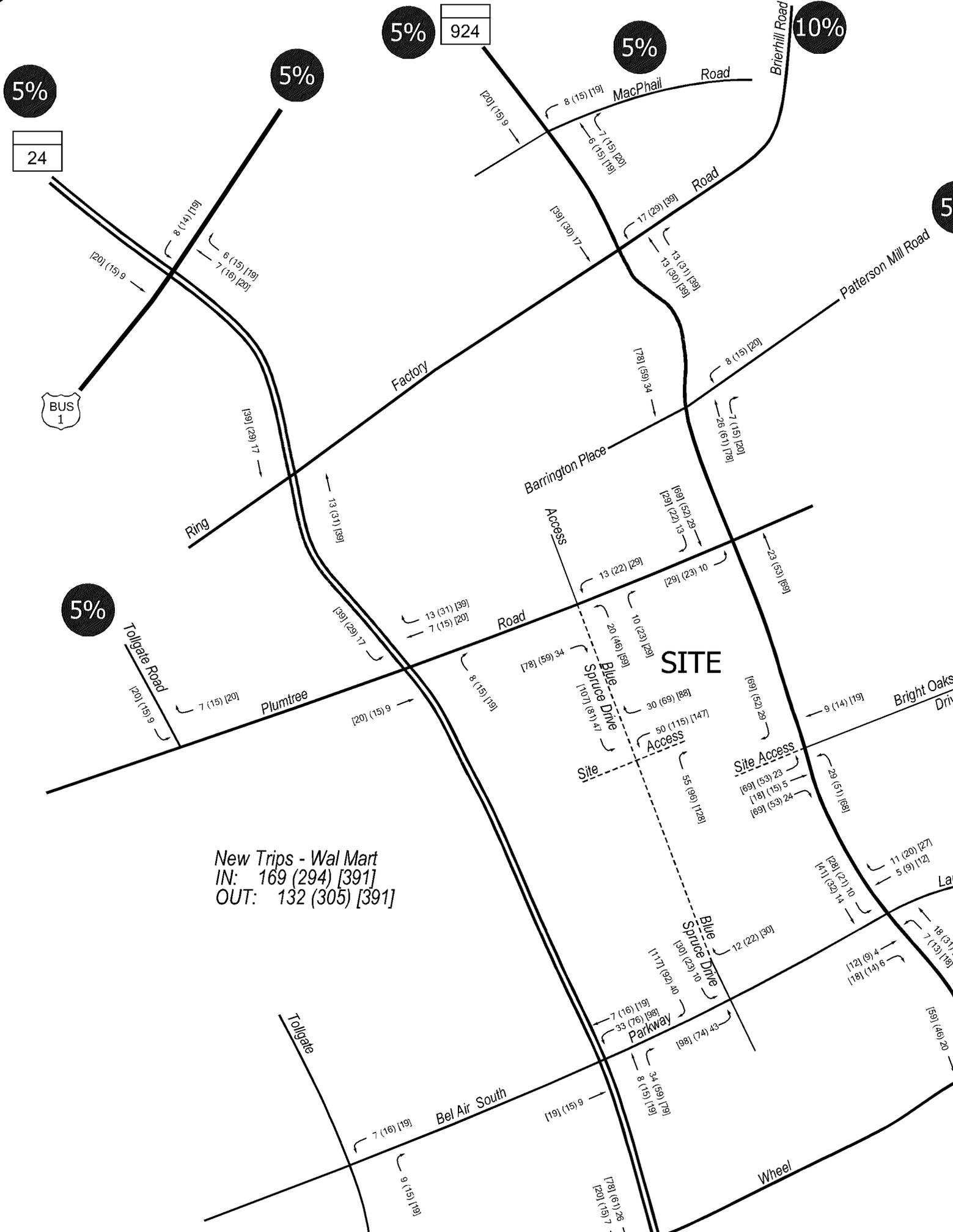
Lau

MacPhail Road

MacPhail Road

Brierhill Road

Patterson Mill Road



5%

24

BUS 1

5%

924

5%

10%

5%

New Trips - Wal Mart
 IN: 169 (294) [391]
 OUT: 132 (305) [391]

SITE

Blue Spruce Drive

Site Access

Access

[69] (53) 23
 [18] (15) 5
 [69] (53) 24

Site

Access

924

5%

24

BUS 1

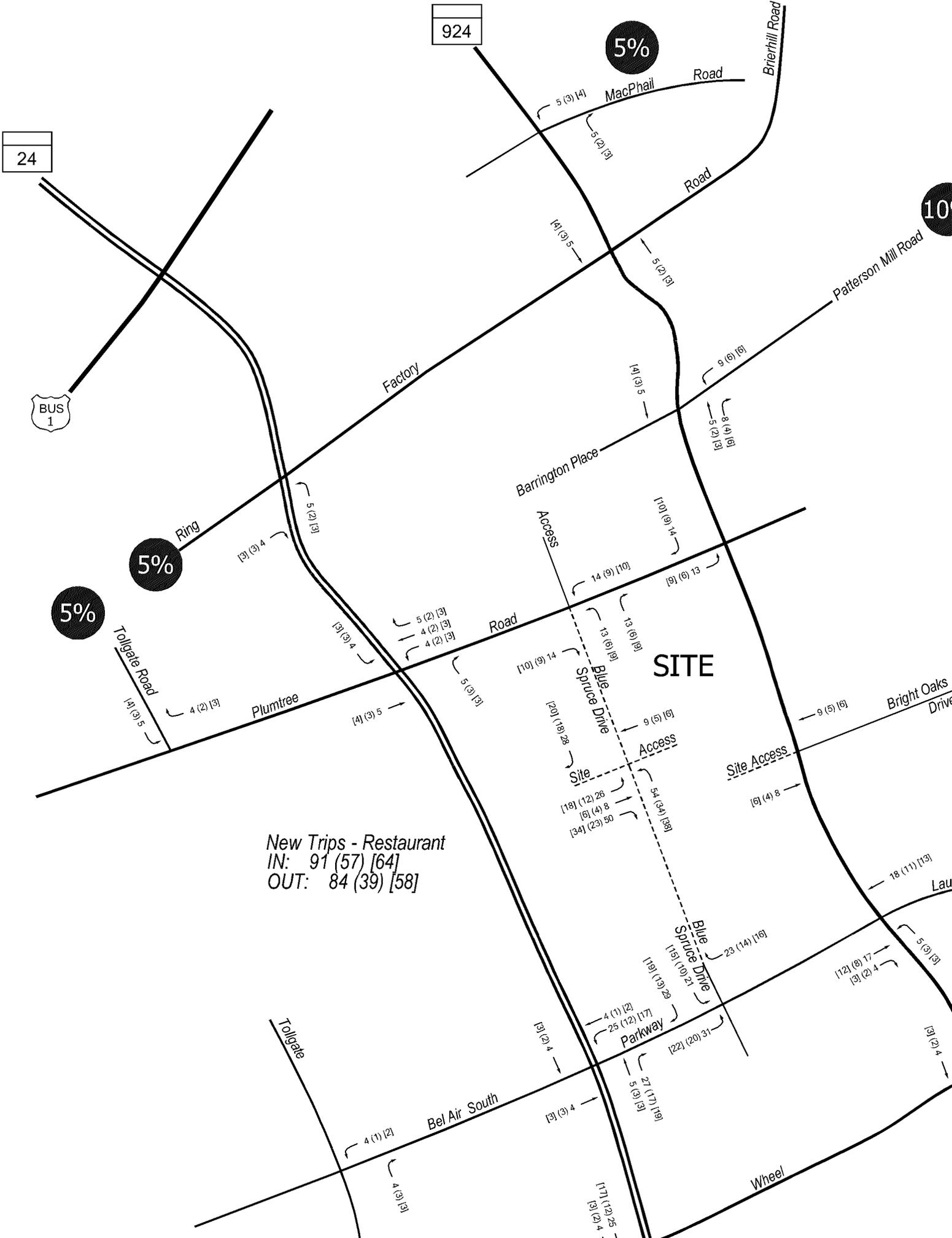
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5%

5%

SITE

New Trips - Restaurant
IN: 91 (57) [64]
OUT: 84 (39) [58]



924

24



Pass-by Trips
 IN: 0 (157) [166]
 OUT: 0 (149) [160]

SITE

Site Access

Site

Blue Spruce Drive

Parkway

Blue Spruce Drive

Access

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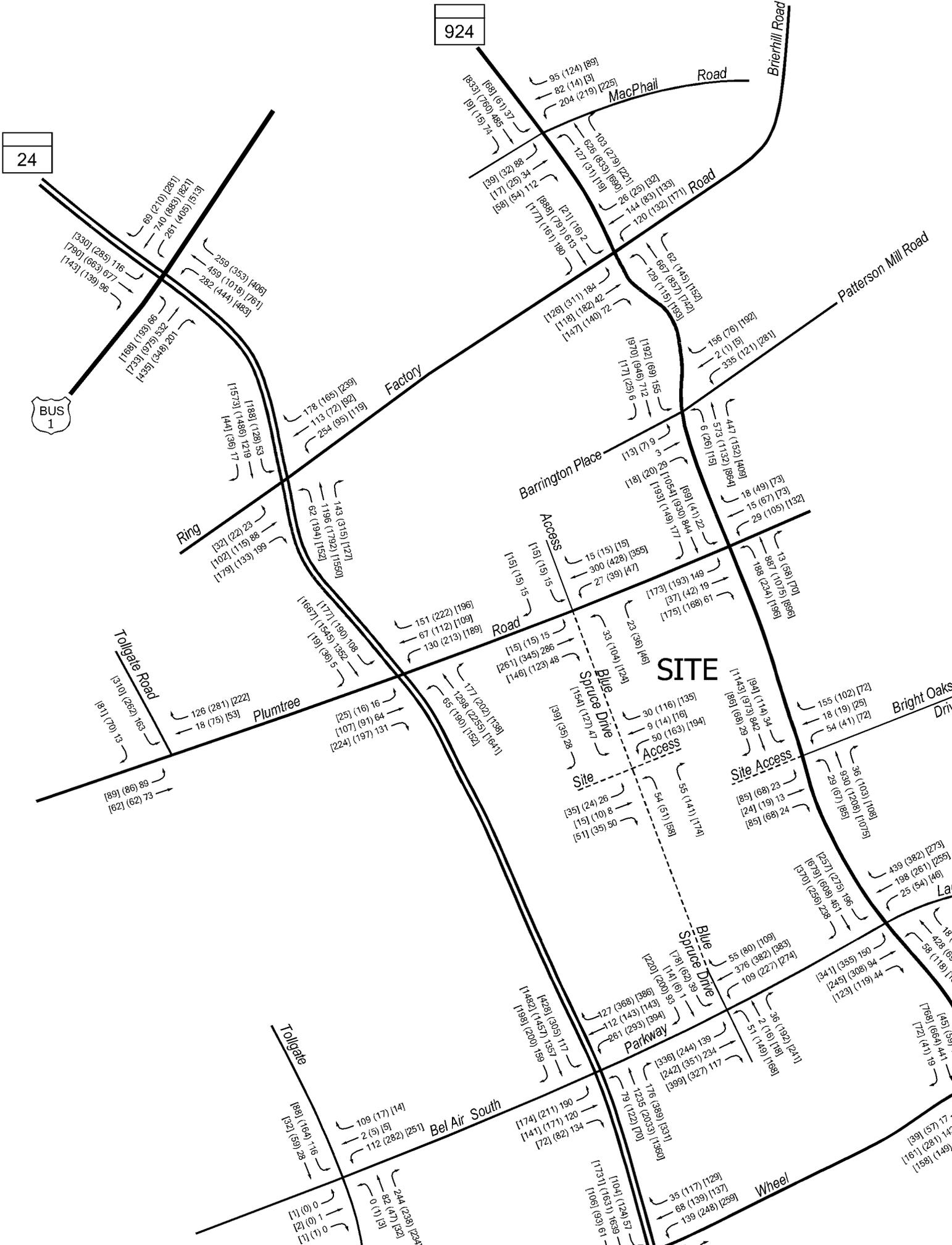
Access

Site Access

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924

24



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19100 (646) 72

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50 (163) [194]

184 (114) 34

1143 (973) 842

189 (68) 28

155 (102) [72]

18 (19) [25]

54 (41) [72]

1310 (282) 163

181 (70) 13

126 (281) [222]

18 (75) [53]

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107 (91) 64

224 (197) 131

177 (190) 108

177 (1545) 1392

16 (36) 5

177 (202) [158]

1286 (225) [1411]

65 (190) [152]

154 (127) 47

39 (39) 38

30 (116) [135]

9 (14) [16]

50 (163) [194]

184 (114) 34

1143 (973) 842

189 (68) 28

155 (102) [72]

18 (19) [25]

54 (41) [72]

89 (86) 89

162 (62) 73

126 (281) [222]

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126 (281) [222]

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154 (127) 47

39 (39) 38

30 (116) [135]

9 (14) [16]

50 (163) [194]

184 (114) 34

1143 (973) 842

189 (68) 28

155 (102) [72]

18 (19) [25]

54 (41) [72]

89 (86) 89

162 (62) 73

126 (281) [222]

18 (75) [53]

25 (16) 16

107 (91) 64

224 (197) 131

177 (190) 108

177 (1545) 1392

16 (36) 5

177 (202) [158]

1286 (225) [1411]

65 (190) [152]

154 (127) 47

39 (39) 38

30 (116) [135]

9 (14) [16]

50 (163) [194]

184 (114) 34

1143 (973) 842

189 (68) 28

155 (102) [72]

18 (19) [25]

54 (41) [72]

89 (86) 89

162 (62) 73

126 (281) [222]

18 (75) [53]

25 (16) 16

107 (91) 64

224 (197) 131

177 (190) 108

177 (1545) 1392

16 (36) 5

177 (202) [158]

1286 (225) [1411]

CLV Methodology**2015 Total Traffic w. Improvements**

	Right-in/Right-out on MD 924	Full Access on MD 924
Morning Peak Hour Traffic	LOS / CLV	LOS / CLV
8. MD 924 & Plumtree Rd	C / 1160	B / 1121
11. Bel Air South Pkwy & Blue Spruce Dr	A / 486	A / 473
12. MD 924 & Bel Air South Pkwy	A / 939	A / 930
19. Plumtree Rd & Blue Spruce Dr	A / 421	A / 408
20. MD 924 & Bright Oaks Dr / Site Access	A / 685	A / 690
Evening Peak Hour Traffic	LOS / CLV	LOS / CLV
8. MD 924 & Plumtree Rd	D / 1417	D / 1330
11. Bel Air South Pkwy & Blue Spruce Dr	A / 946	A / 954
12. MD 924 & Bel Air South Pkwy	C / 1271	C / 1200
19. Plumtree Rd & Blue Spruce Dr	A / 594	A / 594
20. MD 924 & Bright Oaks Dr / Site Access	A / 915	A / 913
Saturday Midday Peak Hour Traffic	LOS / CLV	LOS / CLV
8. MD 924 & Plumtree Rd	E / 1527	D / 1418
11. Bel Air South Pkwy & Blue Spruce Dr	B / 1074	B / 1039
12. MD 924 & Bel Air South Pkwy	D / 1332	C / 1241
19. Plumtree Rd & Blue Spruce Dr	A / 541	A / 541
20. MD 924 & Bright Oaks Dr / Site Access	A / 878	A / 904



**EXHIBIT 6
RESULTS OF INTERSECTION
CAPACITY ANALYSES (CLV)**

Synchro Analysis

2015 Total Traffic w. Improvements

		Right-in/Right-out on MD 924	Full Access on MD 924
Morning Peak Hour Traffic	Control Type	LOS / DELAY	LOS / DELAY
8. MD 924 & Plumtree Rd	Signal	B / 19.9	B / 17.4
11. Bel Air South Pkwy & Blue Spruce Dr	Signal for Improvement	C / 25.2	C / 25.6
12. MD 924 & Bel Air South Pkwy	Signal	C / 34.6	C / 33.8
19. Plumtree Rd & Blue Spruce Dr	Signal for Improvement	B / 14.6	B / 14.9
20. MD 924 & Bright Oaks Dr / Site Access	Signal for Improvement	A / 6.5	A / 7.7
Evening Peak Hour Traffic		LOS / DELAY	LOS / DELAY
8. MD 924 & Plumtree Rd	Signal	C / 28.0	C / 25.9
11. Bel Air South Pkwy & Blue Spruce Dr	Signal for Improvement	B / 14.8	B / 14.6
12. MD 924 & Bel Air South Pkwy	Signal	D / 49.3	D / 47.5
19. Plumtree Rd & Blue Spruce Dr	Signal for Improvement	B / 12.6	B / 12.1
20. MD 924 & Bright Oaks Dr / Site Access	Signal for Improvement	A / 6.3	A / 7.7
Midday Saturday Peak Hour Traffic		LOS / DELAY	LOS / DELAY
8. MD 924 & Plumtree Rd	Signal	C / 30.4	C / 24.5
11. Bel Air South Pkwy & Blue Spruce Dr	Signal for Improvement	B / 19.7	B / 18.8
12. MD 924 & Bel Air South Pkwy	Signal	D / 46.0	D / 40.1
19. Plumtree Rd & Blue Spruce Dr	Signal for Improvement	B / 11.9	B / 11.5
20. MD 924 & Bright Oaks Dr / Site Access	Signal for Improvement	A / 6.1	A / 7.7



**EXHIBIT 7
RESULTS OF INTERSECTION
CAPACITY ANALYSES (SYNCHRO)**

SimTraffic (5 runs)	Right-in/Right-out on MD 924			Full Access on MD 924			Available Storage Length (ft.)
	AM	PM	SAT	AM	PM	SAT	
2015 Total Traffic w. Improvements	95th percentile queue (ft.)			95th percentile queue (ft.)			
8. MD 924 & Plumtree Rd							
Eastbound Plumtree Rd left turn:	243	357	420	219	250	272	120, can be extended to 800 ft
Westbound Plumtree Rd left turn:	66	146	180	65	147	183	
Westbound Plumtree Rd right turn:	35	54	53	36	62	72	
Northbound MD 924 left turn:	152	248	234	149	178	170	
Southbound MD 924 left turn:	36	56	65	38	62	60	
Southbound MD 924 right turn:	321	386	447	288	344	433	
11. Bel Air South Pkwy & Blue Spruce Dr							
Eastbound Bel Air South Pkwy left turn:	129	134	236	151	126	233	130
Northbound Blue Spruce Dr left/thru:	57	384	146	54	175	161	230
Northbound Blue Spruce Dr right turn:	37	320	90	43	84	85	230
Southbound Blue Spruce Dr approach:	58	222	88	57	115	97	250
12. MD 924 & Bel Air South Pkwy							
Eastbound Bel Air South Pkwy left turn:	125	244	219	137	243	211	210
Eastbound Bel Air South Pkwy right turn:	51	101	101	51	86	110	600
Westbound Bel Air South Pkwy left turn:	100	164	187	106	169	147	130
Westbound Bel Air South Pkwy right turn:	211	253	118	203	269	143	210
Northbound MD 924 left turn:	83	187	179	64	136	126	500
Southbound MD 924 left turn:	79	129	214	89	116	160	350
Southbound MD 924 right turn:	104	147	414	94	139	187	480
19. Plumtree Rd & Blue Spruce Dr							
Eastbound Plumtree Rd right turn:	54	75	212	53	80	67	new
Westbound Plumtree Rd left turn:	43	169	52	37	35	44	new
Northbound Blue Spruce Dr left turn:	39	112	89	34	104	92	new
Northbound Blue Spruce Dr right turn:	51	76	118	35	50	50	new
20. MD 924 & Bright Oaks Dr / Site Access							
Eastbound Site Access left/thru:				53	84	107	new
Eastbound Site Access right turn:	26	53	73	27	50	68	new
Westbound Bright Oaks Dr left turn:	76	54	81	80	68	94	1000
Westbound Bright Oaks Dr right turn:	79	67	63	73	62	49	170
Northbound MD 924 left turn:				31	57	73	new
Northbound MD 924 right turn:	<25	35	35	<25	<25	25	180
Southbound MD 924 left turn:	46	106	80	42	87	95	250
Southbound MD 924 right turn:	<25	<25	<25	<25	<25	29	new



EXHIBIT 8
RESULTS OF INTERSECTION
QUEUING ANALYSES

924

Extend left lane (50 ft)

24

Extend right lane (75 ft)

BUS 1

Extend right lane (25 ft)

SITE

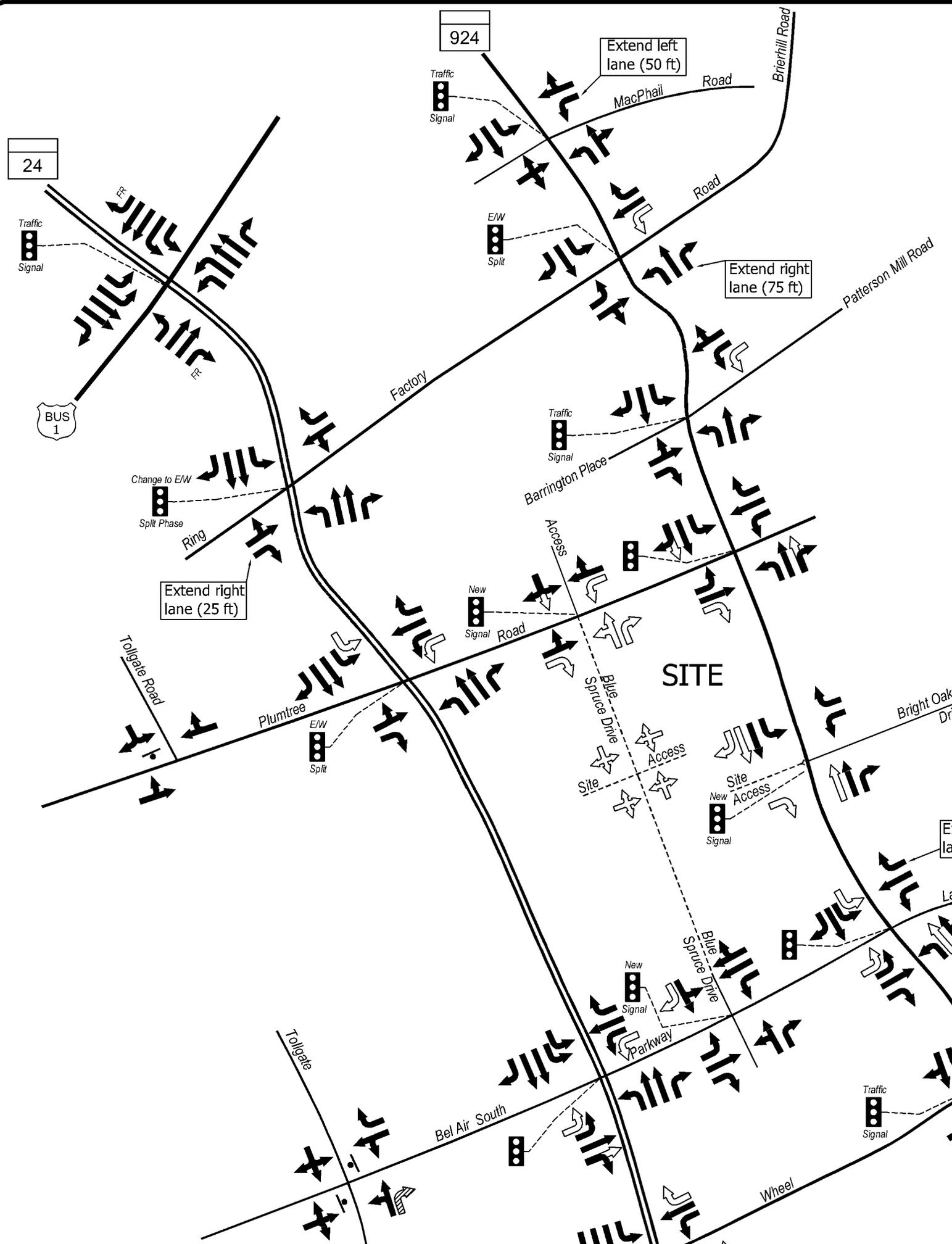
Bright Oaks Drive

Ext lan

Lau

Bel Air South

Wheel



924

Extend left lane (50 ft)

24

Extend right lane (75 ft)

BUS 1

Extend right lane (25 ft)

SITE

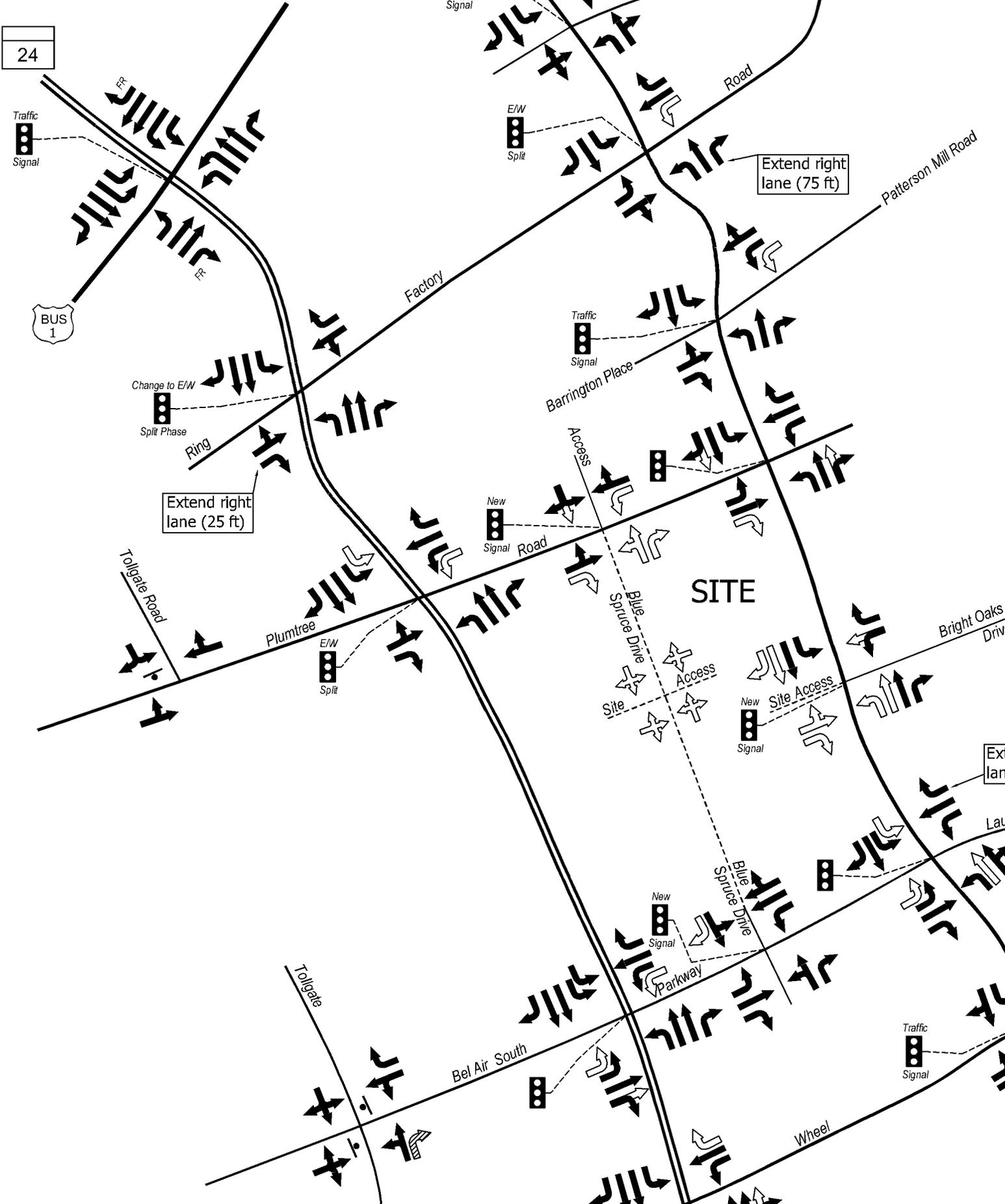
Bright Oaks Drive

Ext lan

Lau

Bel Air South

Wheel



APPENDIX

- Analyses for Right-in/Right-out Access vs. Full Access on MD 924
 - Analyses for Site Access Points along Blue Spruce Drive
(Scenario: Right-in/Right-out Access on MD 924)
 - Analyses for Site Access Points along Blue Spruce Drive
(Scenario: Full Access on MD 924)



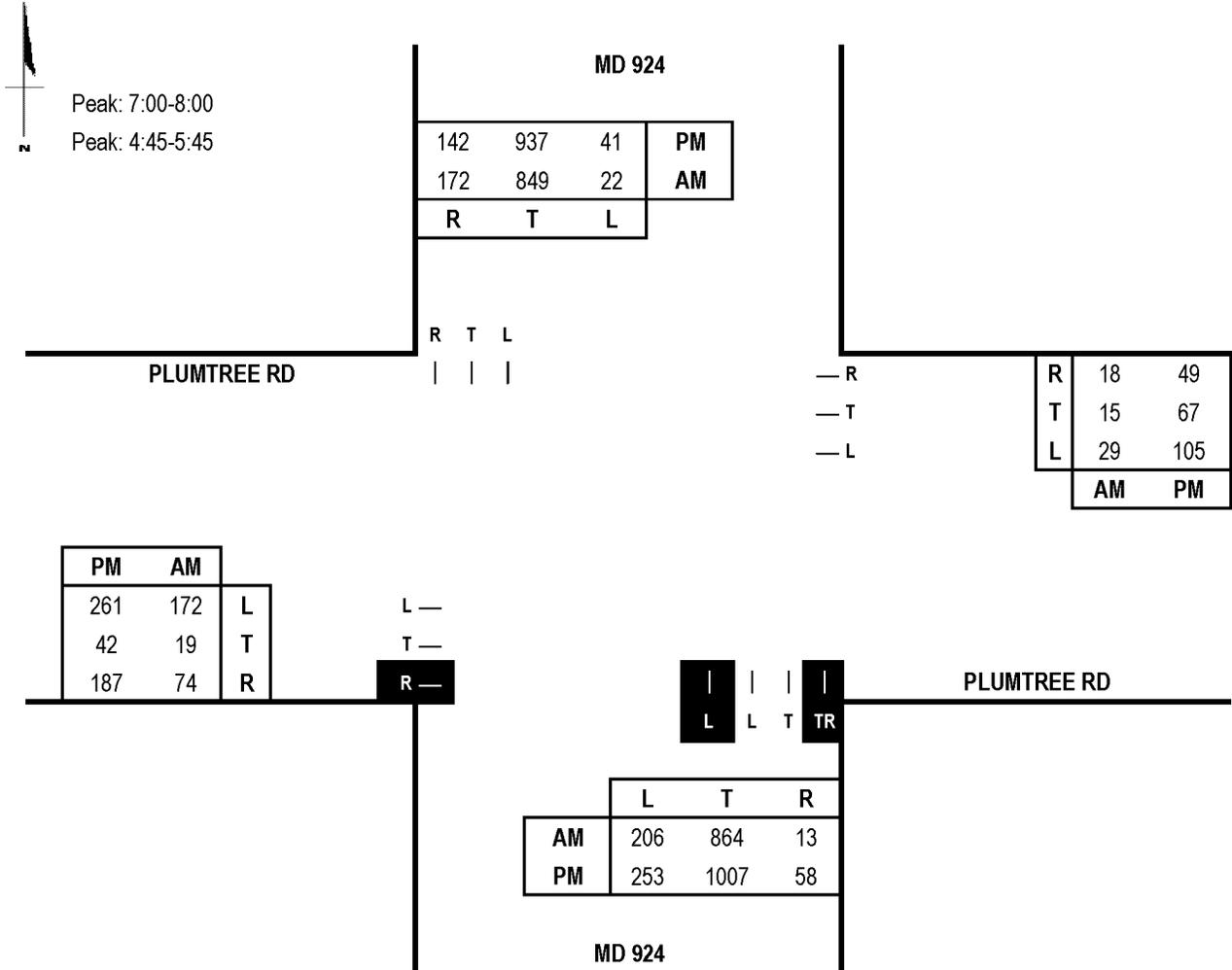
Analyses for Right-in/Right-out Access vs. Full Access on MD 924



CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Plumtree Rd
N/S Road: MD 924
Conditions: RIRO Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	877	0.55	482	22	1.00	22	973
SB	849	1.00	849	206	0.60	124	
EB	19	1.00	19	29	1.00	29	187
WB	15	1.00	15	172	1.00	172	
CLV TOTAL=							1,160
Level of Service (LOS) =							C

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	1065	0.55	586	41	1.00	41	1089
SB	937	1.00	937	253	0.60	152	
EB	42	1.00	42	105	1.00	105	328
WB	67	1.00	67	261	1.00	261	
CLV TOTAL=							1,417
Level of Service (LOS) =							D

Scenario ID - TOT9

AM V/C = 0.73

PM V/C = 0.89

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Plumtree Rd

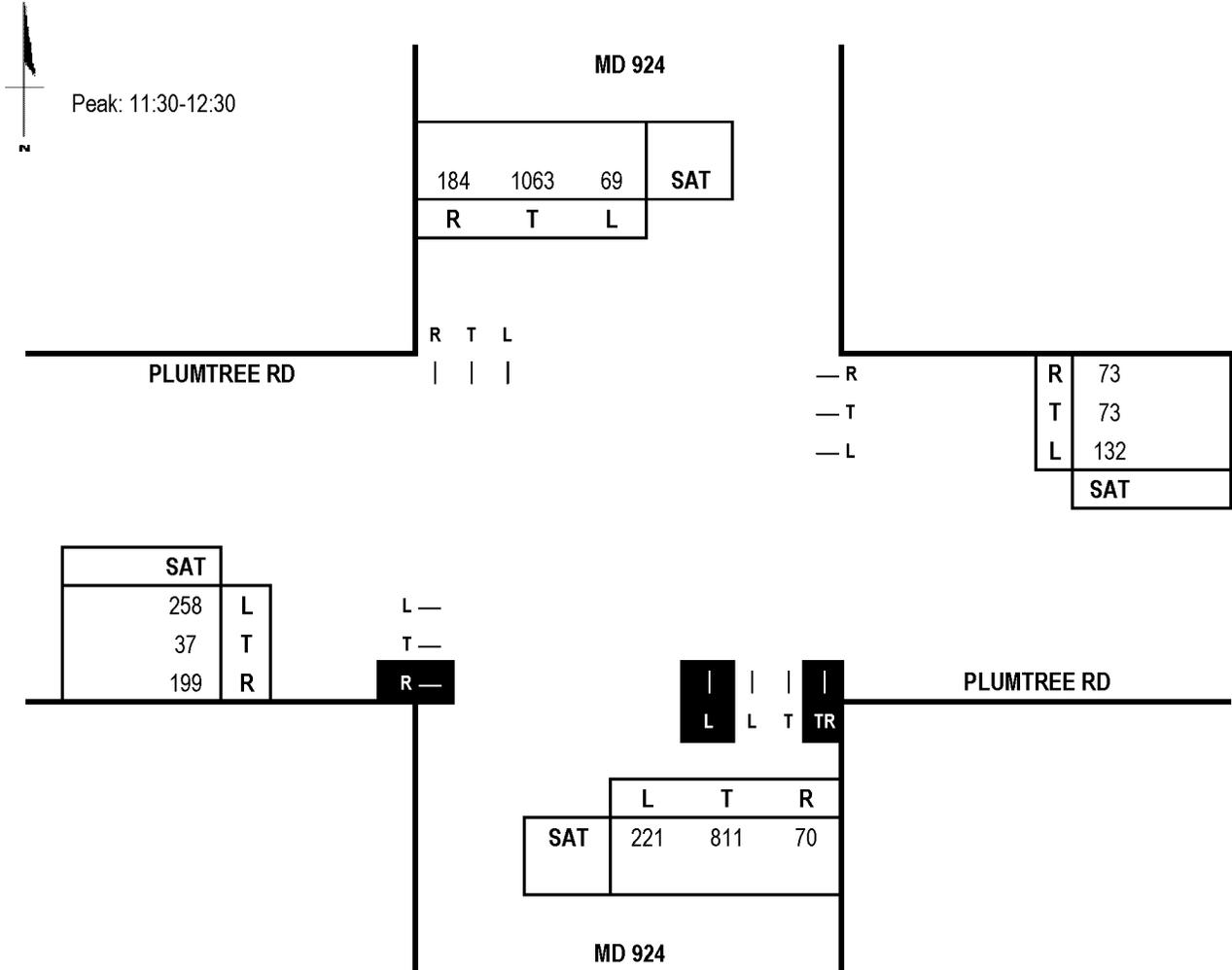
Date of Count: 5/5/2012

N/S Road: MD 924

Day of Count: Saturday

Conditions: RIRO Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	881	0.55	485	69	1.00	69	1196
SB	1063	1.00	1063	221	0.60	133	
EB	66	1.00	66	132	1.00	132	331
WB	73	1.00	73	258	1.00	258	
CLV TOTAL=						1,527	
Level of Service (LOS) =						E	

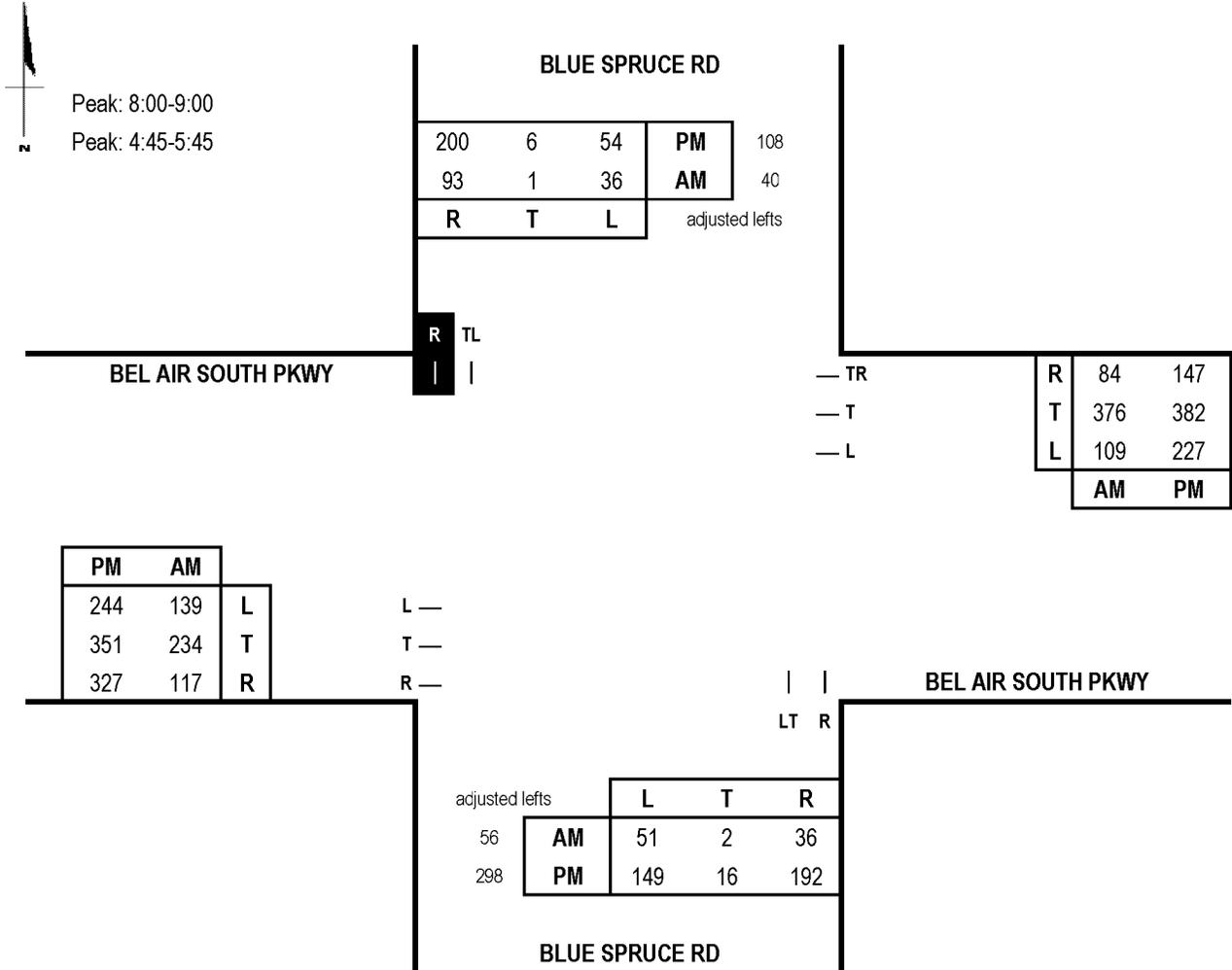
Scenario ID - TOT9

SAT V/C = 0.95

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bel Air South Pkwy
N/S Road: Blue Spruce Rd
Conditions: RIRO Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	58	1.00	58	36	1.00	36	94
SB	41	1.00	41	51	1.00	51	
EB	234	1.00	234	109	1.00	109	392
WB	460	0.55	253	139	1.00	139	
CLV TOTAL=							486
Level of Service (LOS) =							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	314	1.00	314	54	1.00	54	368
SB	114	1.00	114	149	1.00	149	
EB	351	1.00	351	227	1.00	227	578
WB	529	0.55	291	244	1.00	244	
CLV TOTAL=							946
Level of Service (LOS) =							A

Scenario ID - TOT12

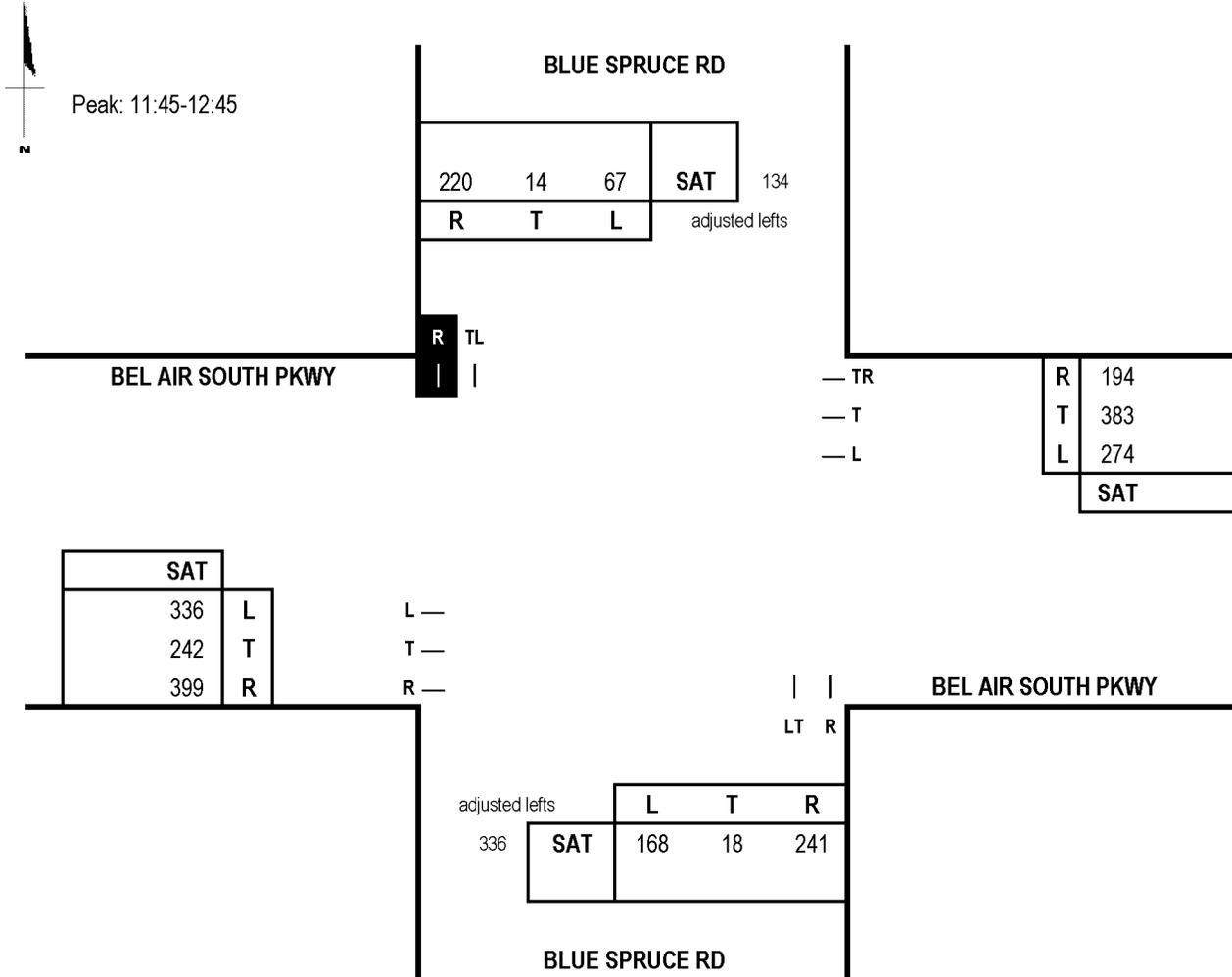
AM V/C = 0.3

PM V/C = 0.59

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bel Air South Pkwy
N/S Road: Blue Spruce Rd
Conditions: RIRO Total Traffic

Date of Count: 5/12/2012
Day of Count: Saturday
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	354	1.00	354	67	1.00	67	421
SB	148	1.00	148	168	1.00	168	
EB	242	1.00	242	274	1.00	274	653
WB	577	0.55	317	336	1.00	336	
CLV TOTAL=							1,074
Level of Service (LOS)=							B

Scenario ID - TOT12

SAT V/C =0.67

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

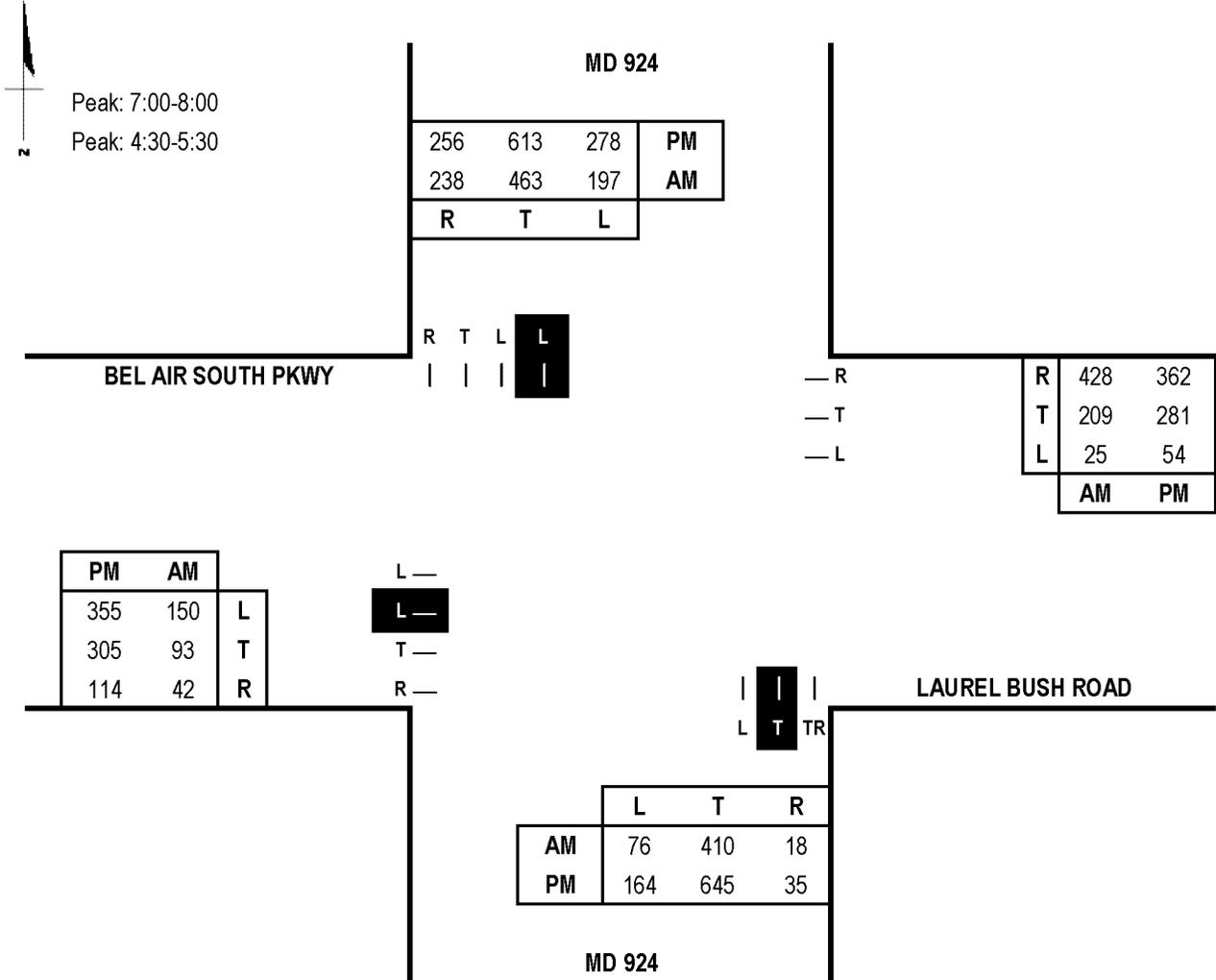
E/W Road: Laurel Bush Road/Bel Air South Pkwy **Date of Count:** 5/10/2012

N/S Road: MD 924

Day of Count: Thursday

Conditions: RIRO Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	428	0.55	235	197	0.60	118	539
SB	463	1.00	463	76	1.00	76	
EB	93	1.00	93	25	1.00	25	400
WB	310	1.00	310	150	0.60	90	
CLV TOTAL=							939
Level of Service (LOS)=							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	680	0.55	374	278	0.60	167	777
SB	613	1.00	613	164	1.00	164	
EB	305	1.00	305	54	1.00	54	494
WB	281	1.00	281	355	0.60	213	
CLV TOTAL=							1,271
Level of Service (LOS)=							C

Scenario ID - TOT13

AM V/C = 0.59

PM V/C = 0.79

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

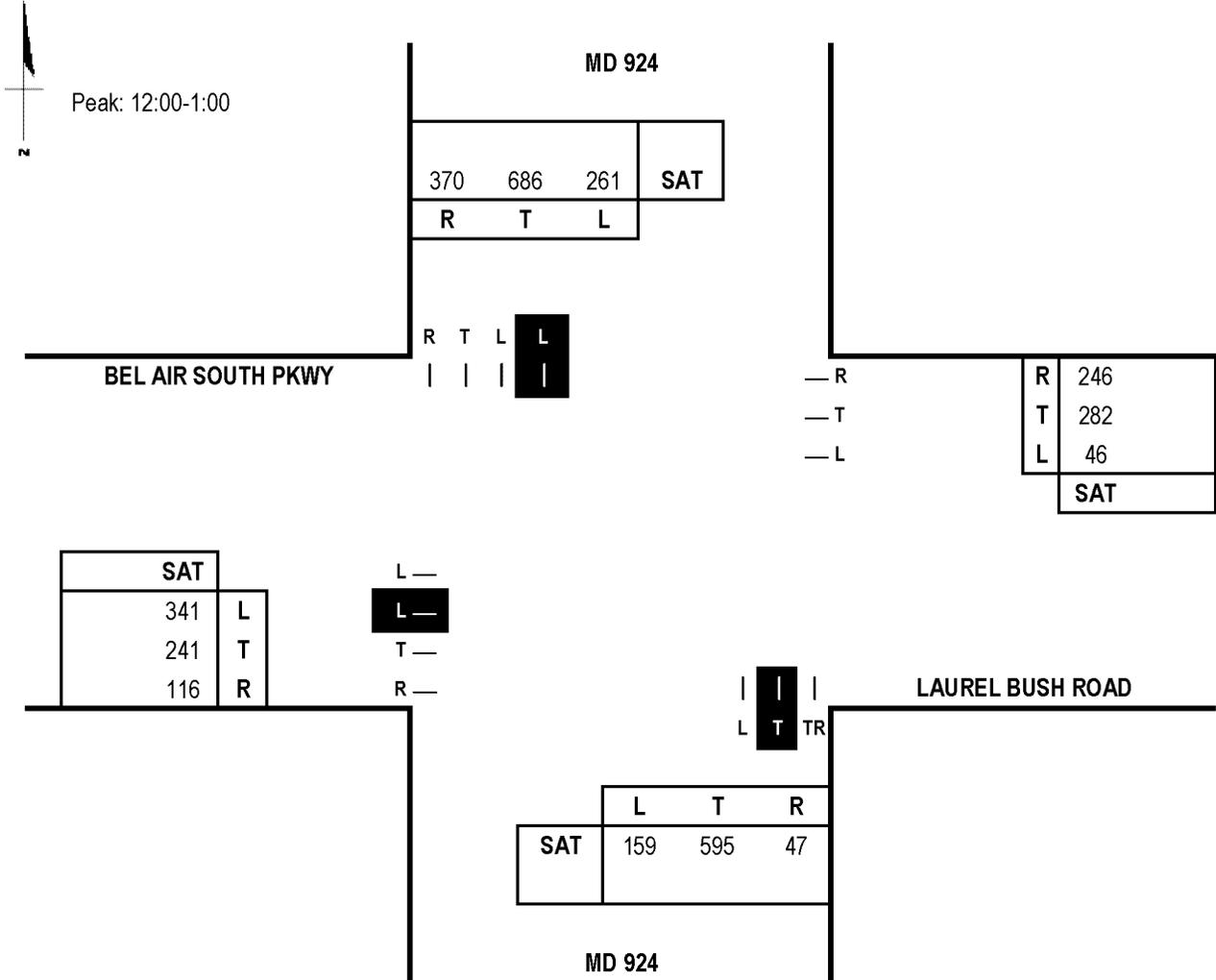
E/W Road: Laurel Bush Road/Bel Air South Pkwy **Date of Count:** 5/5/2012

N/S Road: MD 924

Day of Count: Saturday

Conditions: RIRO Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	642	0.55	353	261	0.60	157	845
SB	686	1.00	686	159	1.00	159	
EB	241	1.00	241	46	1.00	46	487
WB	282	1.00	282	341	0.60	205	
CLV TOTAL=							1,332
Level of Service (LOS)=							D

Scenario ID - TOT13

SAT V/C = 0.83

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Plumtree Road

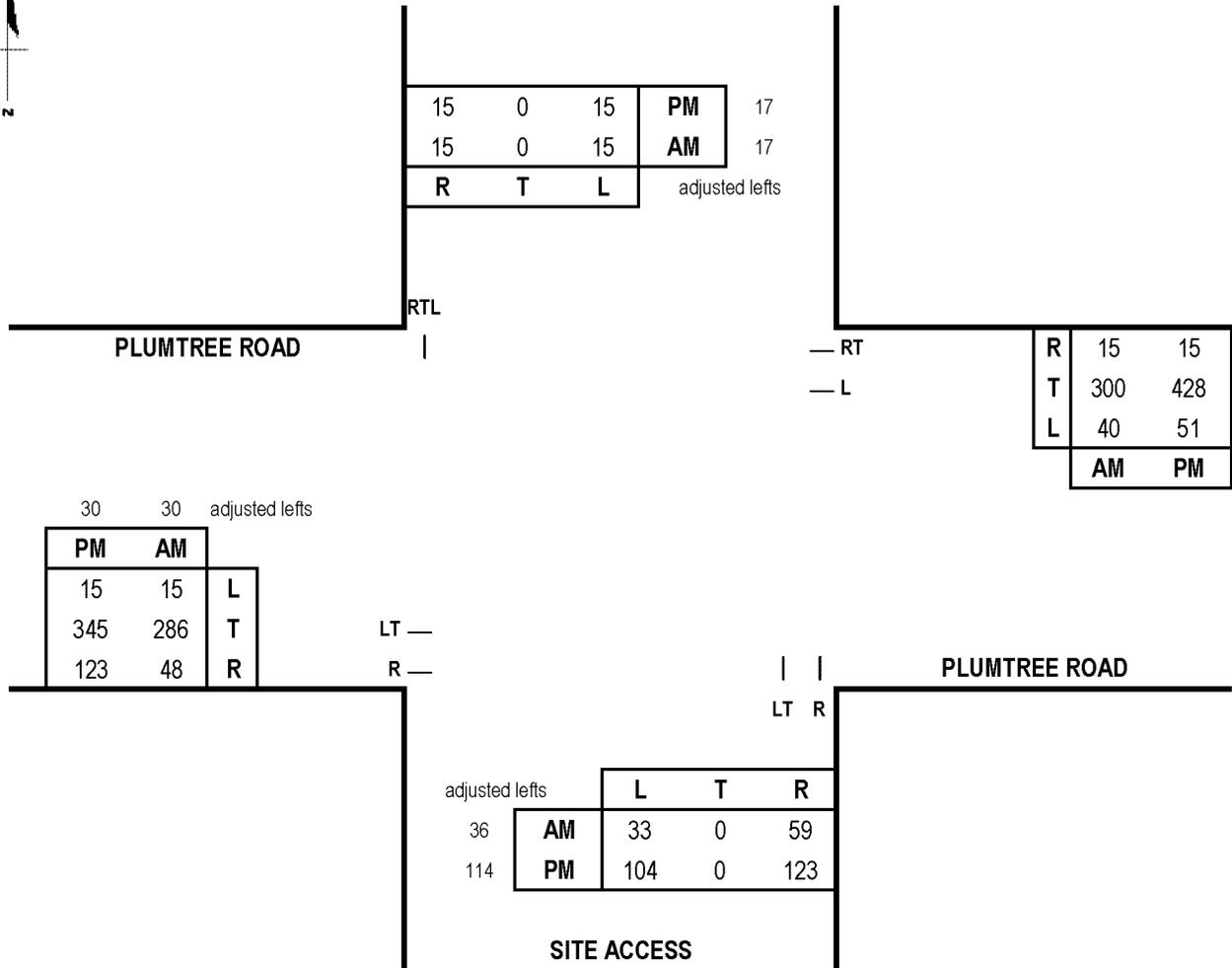
Date of Count:

N/S Road: Site Access

Day of Count:

Conditions: RIRO Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	36	1.00	36	15	1.00	15	65
SB	32	1.00	32	33	1.00	33	
EB	316	1.00	316	40	1.00	40	356
WB	315	1.00	315	15	1.00	15	
CLV TOTAL=							421
Level of Service (LOS)=							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	114	1.00	114	15	1.00	15	136
SB	32	1.00	32	104	1.00	104	
EB	375	1.00	375	51	1.00	51	458
WB	443	1.00	443	15	1.00	15	
CLV TOTAL=							594
Level of Service (LOS)=							A

Scenario ID - TOT21

AM V/C = 0.26

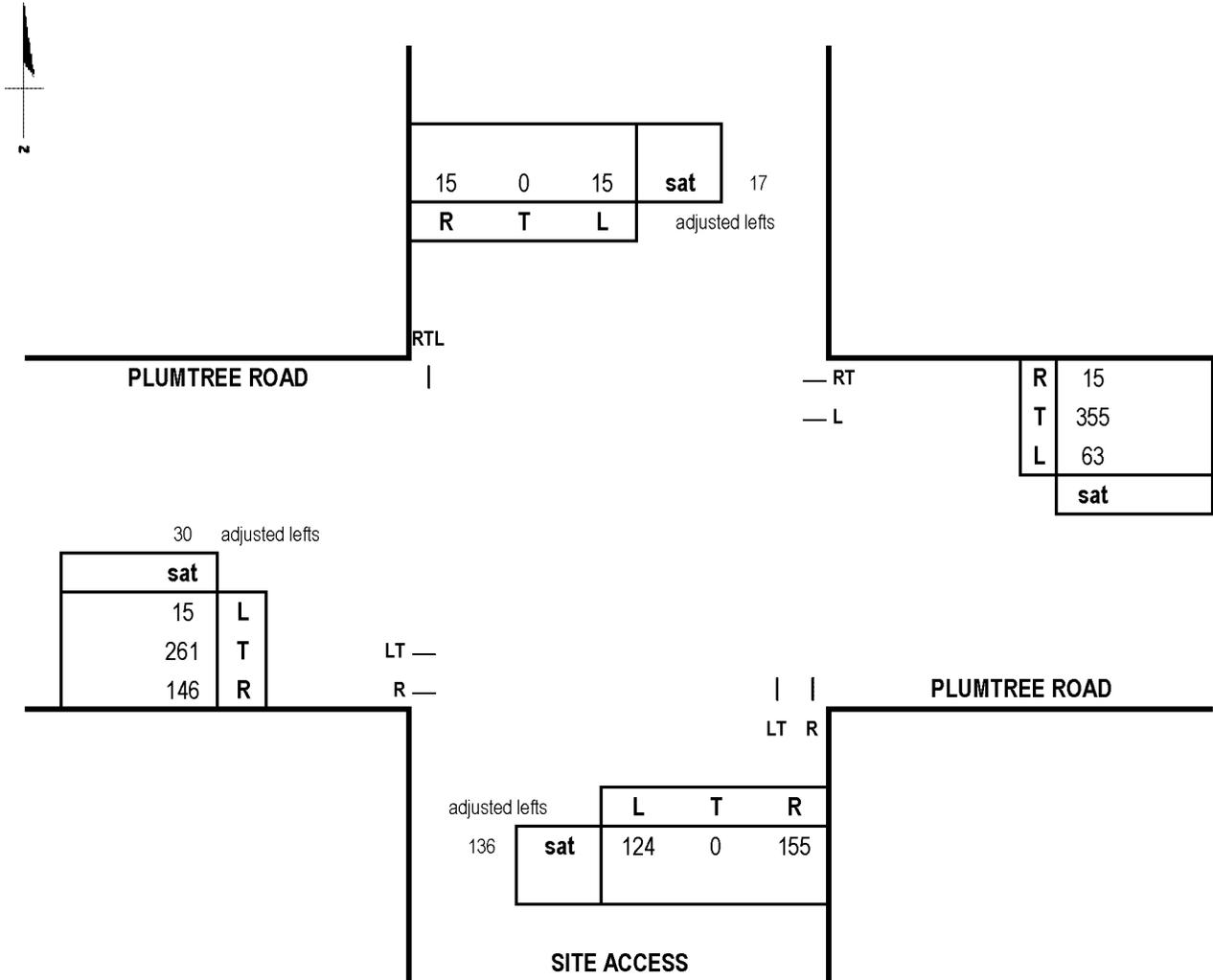
PM V/C = 0.37

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA



E/W Road: Plumtree Road
N/S Road: Site Access
Conditions: RIRO Total Traffic

Date of Count:
Day of Count:
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			sat
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	136	1.00	136	15	1.00	15	156
SB	32	1.00	32	124	1.00	124	
EB	291	1.00	291	63	1.00	63	385
WB	370	1.00	370	15	1.00	15	
CLV TOTAL=							541
Level of Service (LOS) =							A

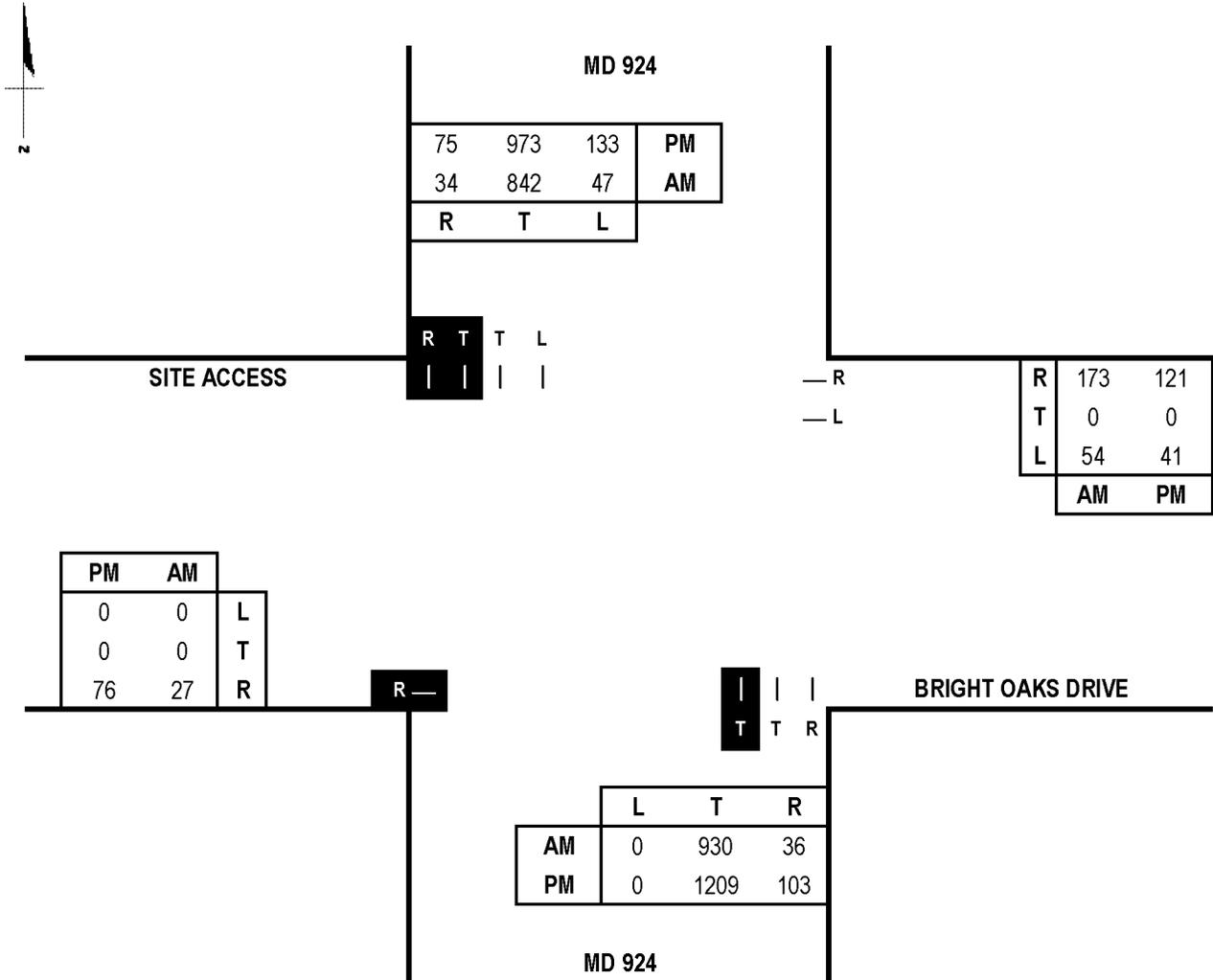
Scenario ID - TOT21

sat V/C = 0.34

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bright Oaks Drive/Site Access
N/S Road: MD 924
Conditions: RIRO Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	930	0.55	512	47	1.00	47	559
SB	842	0.55	463	0	0.00	0	
EB	27	1.00	27	54	1.00	54	126
WB	126	1.00	126	0	0.00	0	
CLV TOTAL=							685
Level of Service (LOS) =							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	1209	0.55	665	133	1.00	133	798
SB	973	0.55	535	0	0.00	0	
EB	76	1.00	76	41	1.00	41	117
WB	0	0.00	0	0	0.00	0	
CLV TOTAL=							915
Level of Service (LOS) =							A

Scenario ID - TOT22

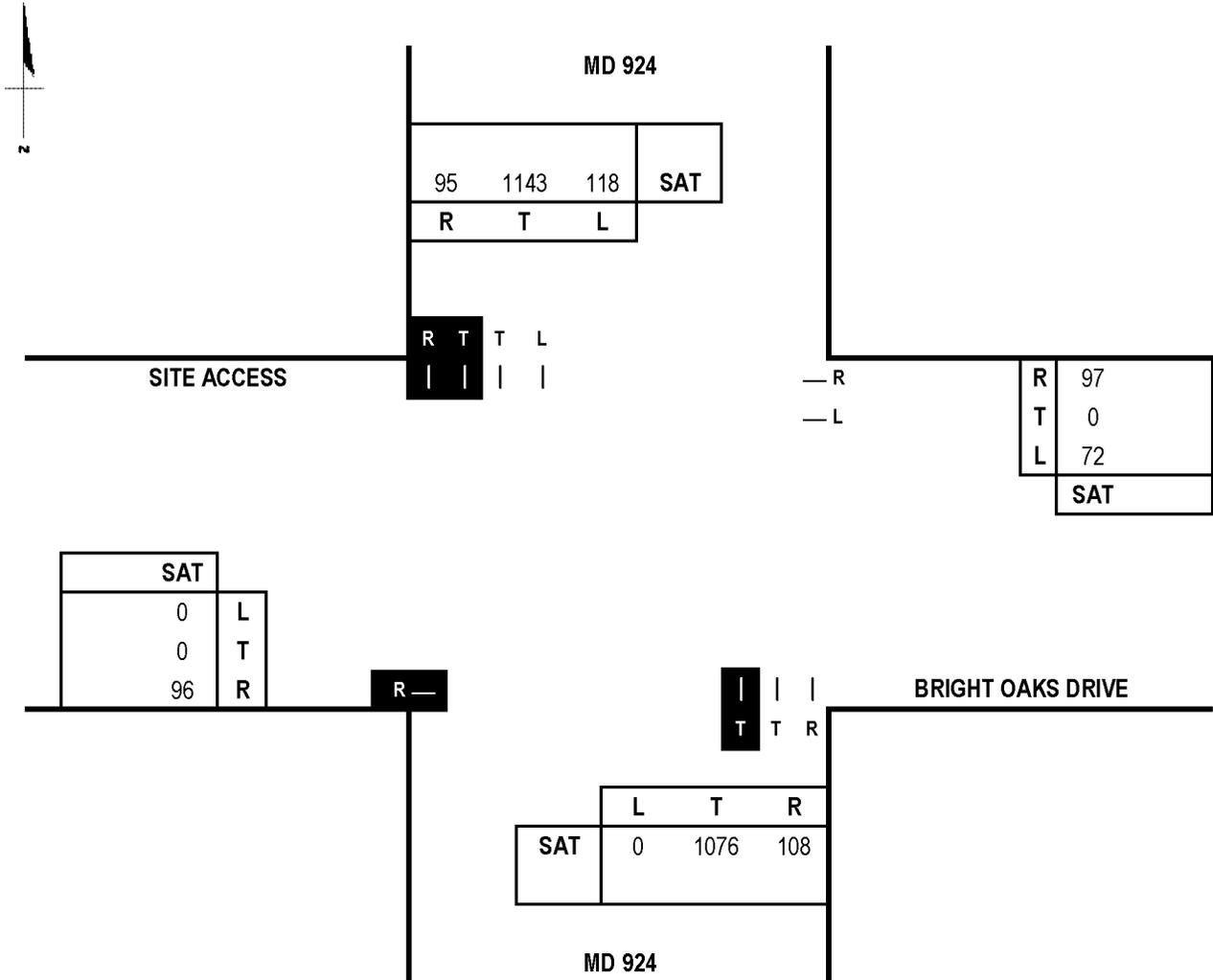
AM V/C = 0.43

PM V/C = 0.57

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bright Oaks Drive/Site Access
N/S Road: MD 924
Conditions: RIRO Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	1076	0.55	592	118	1.00	118	710
SB	1143	0.55	629	0	0.00	0	
EB	96	1.00	96	72	1.00	72	168
WB	0	0.00	0	0	0.00	0	
CLV TOTAL=						878	
Level of Service (LOS)=						A	

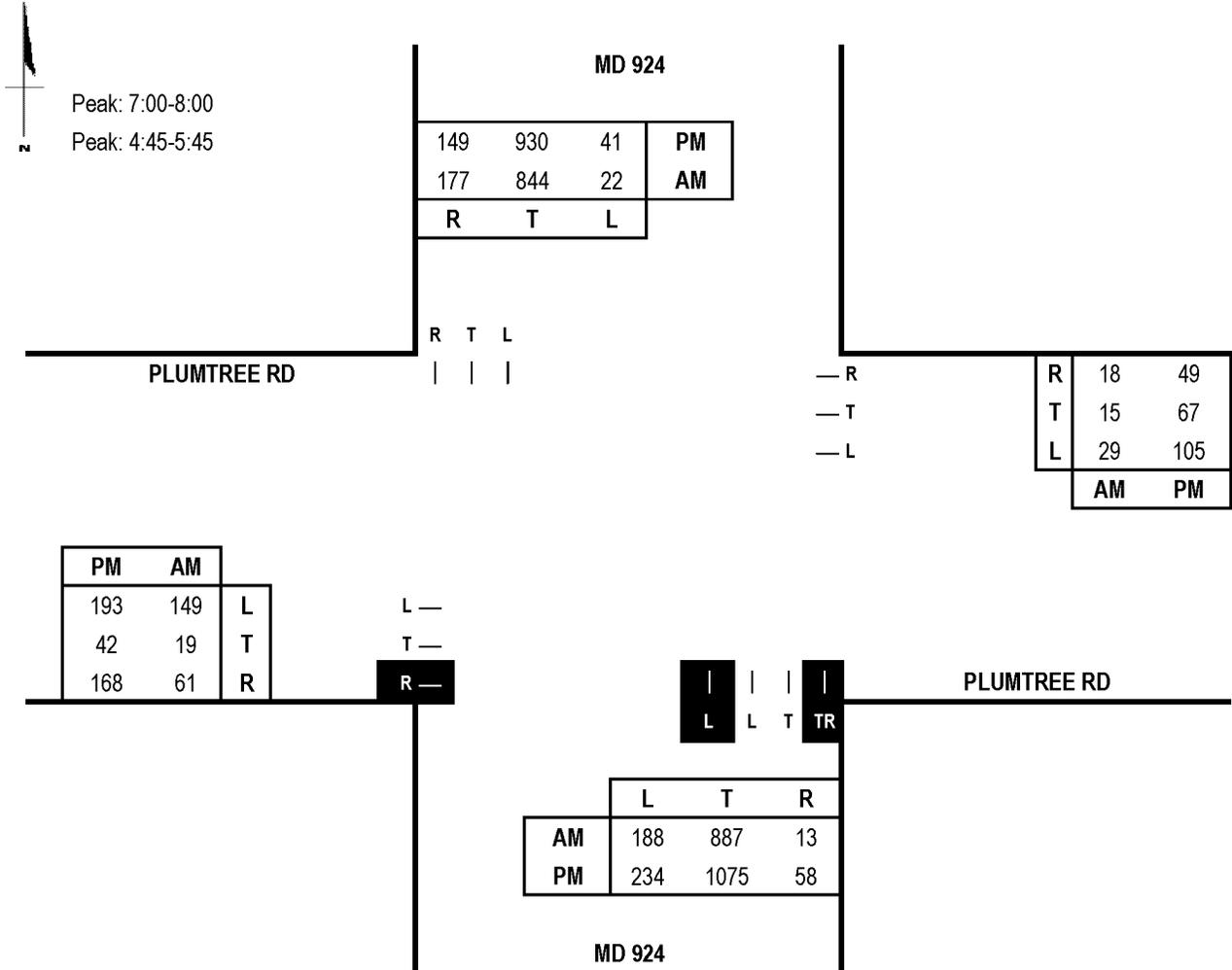
Scenario ID - TOT22

SAT V/C = 0.55

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Plumtree Rd
N/S Road: MD 924
Conditions: Full Acc Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	900	0.55	495	22	1.00	22	957
SB	844	1.00	844	188	0.60	113	
EB	19	1.00	19	29	1.00	29	164
WB	15	1.00	15	149	1.00	149	
CLV TOTAL=							1,121
Level of Service (LOS)=							B

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	1133	0.55	623	41	1.00	41	1070
SB	930	1.00	930	234	0.60	140	
EB	42	1.00	42	105	1.00	105	260
WB	67	1.00	67	193	1.00	193	
CLV TOTAL=							1,330
Level of Service (LOS)=							D

Scenario ID - TOT9

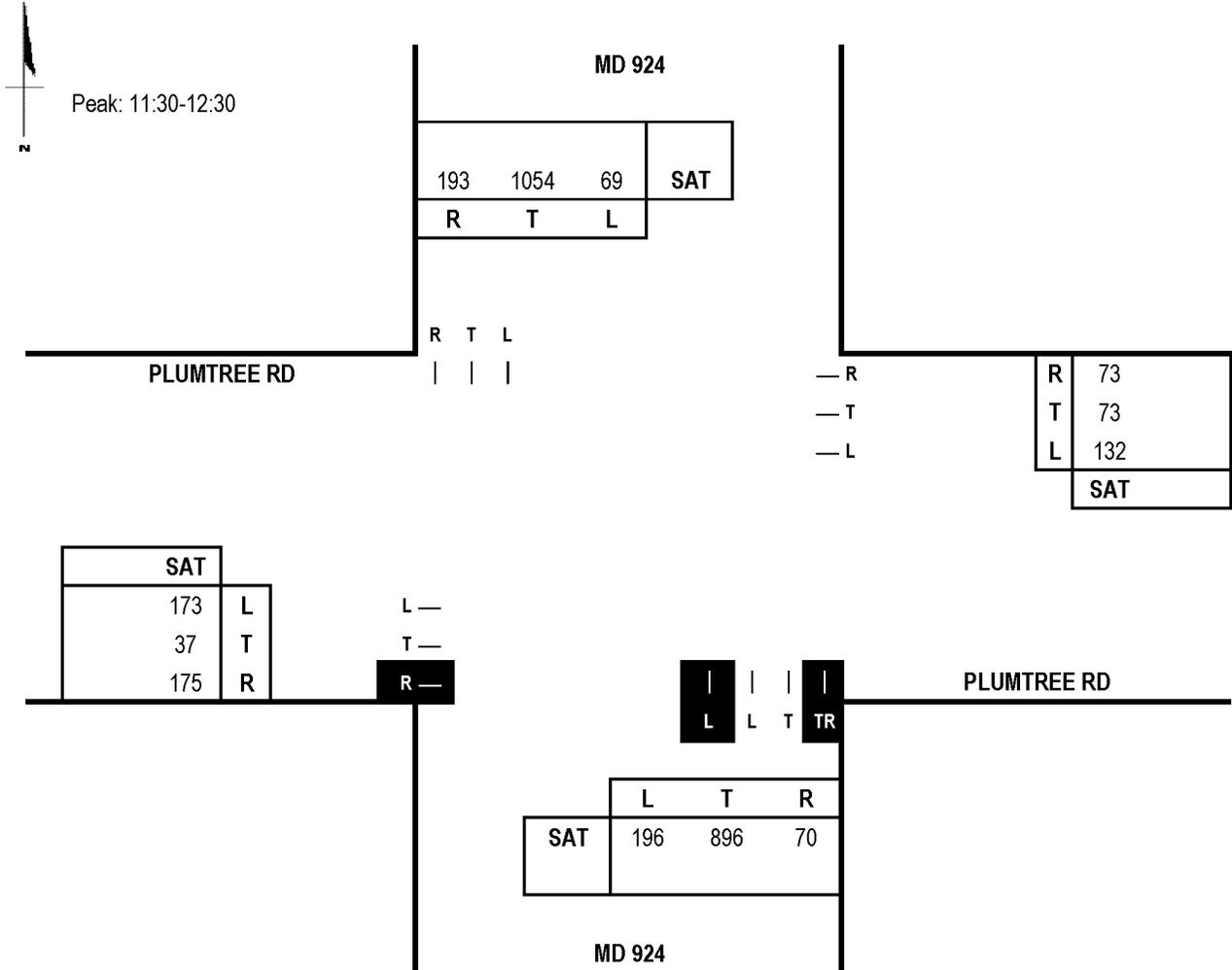
AM V/C = 0.7

PM V/C = 0.83

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Plumtree Rd
N/S Road: MD 924
Conditions: Full Acc Total Traffic

Date of Count: 5/5/2012
Day of Count: Saturday
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	966	0.55	531	69	1.00	69	1172
SB	1054	1.00	1054	196	0.60	118	
EB	57	1.00	57	132	1.00	132	246
WB	73	1.00	73	173	1.00	173	
CLV TOTAL=							1,418
Level of Service (LOS)=							D

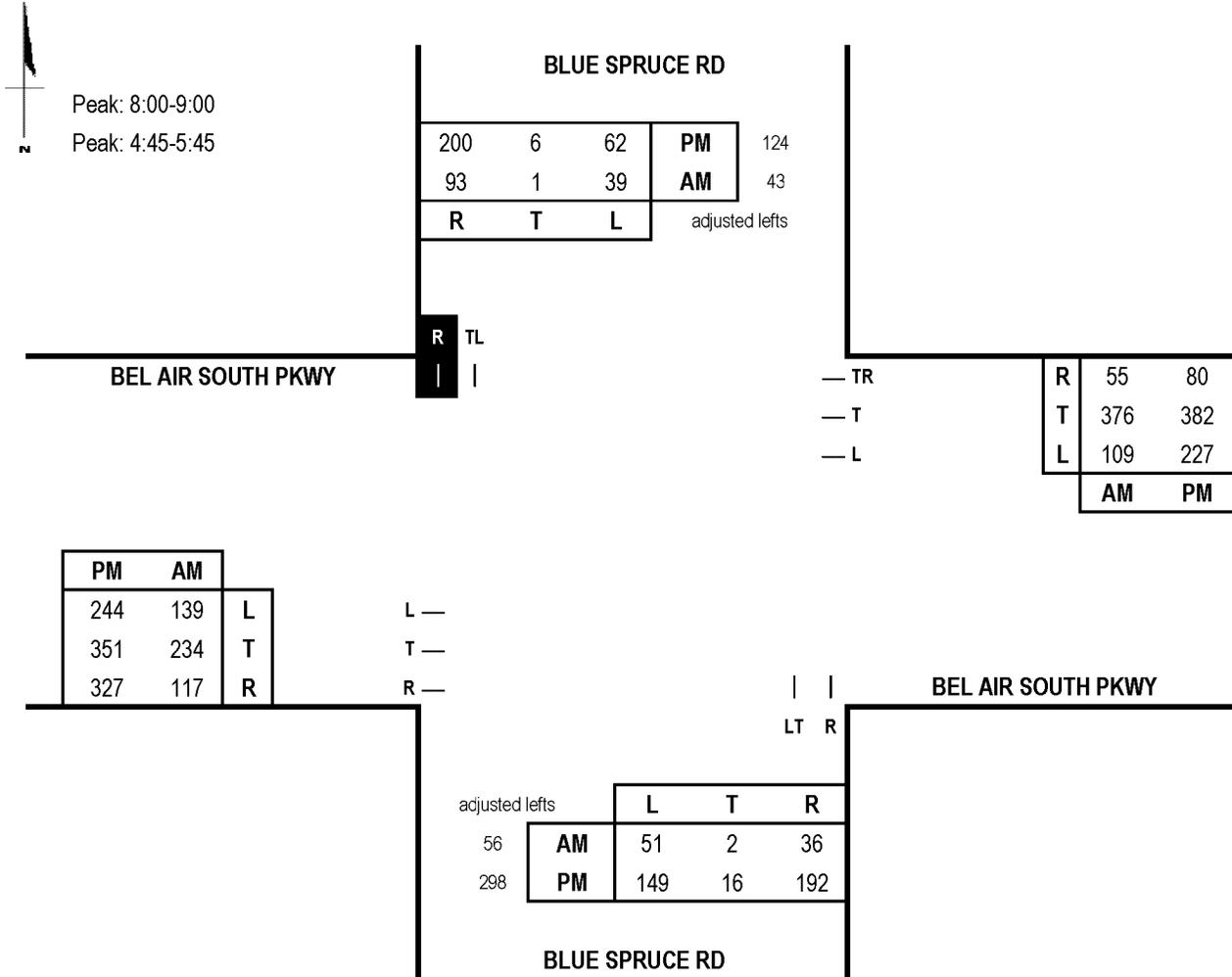
Scenario ID - TOT9

SAT V/C = 0.89

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bel Air South Pkwy
N/S Road: Blue Spruce Rd
Conditions: Full Acc Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	58	1.00	58	39	1.00	39	97
SB	44	1.00	44	51	1.00	51	
EB	234	1.00	234	109	1.00	109	376
WB	431	0.55	237	139	1.00	139	
CLV TOTAL=							473
Level of Service (LOS) =							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	314	1.00	314	62	1.00	62	376
SB	130	1.00	130	149	1.00	149	
EB	351	1.00	351	227	1.00	227	578
WB	462	0.55	254	244	1.00	244	
CLV TOTAL=							954
Level of Service (LOS) =							A

Scenario ID - TOT12

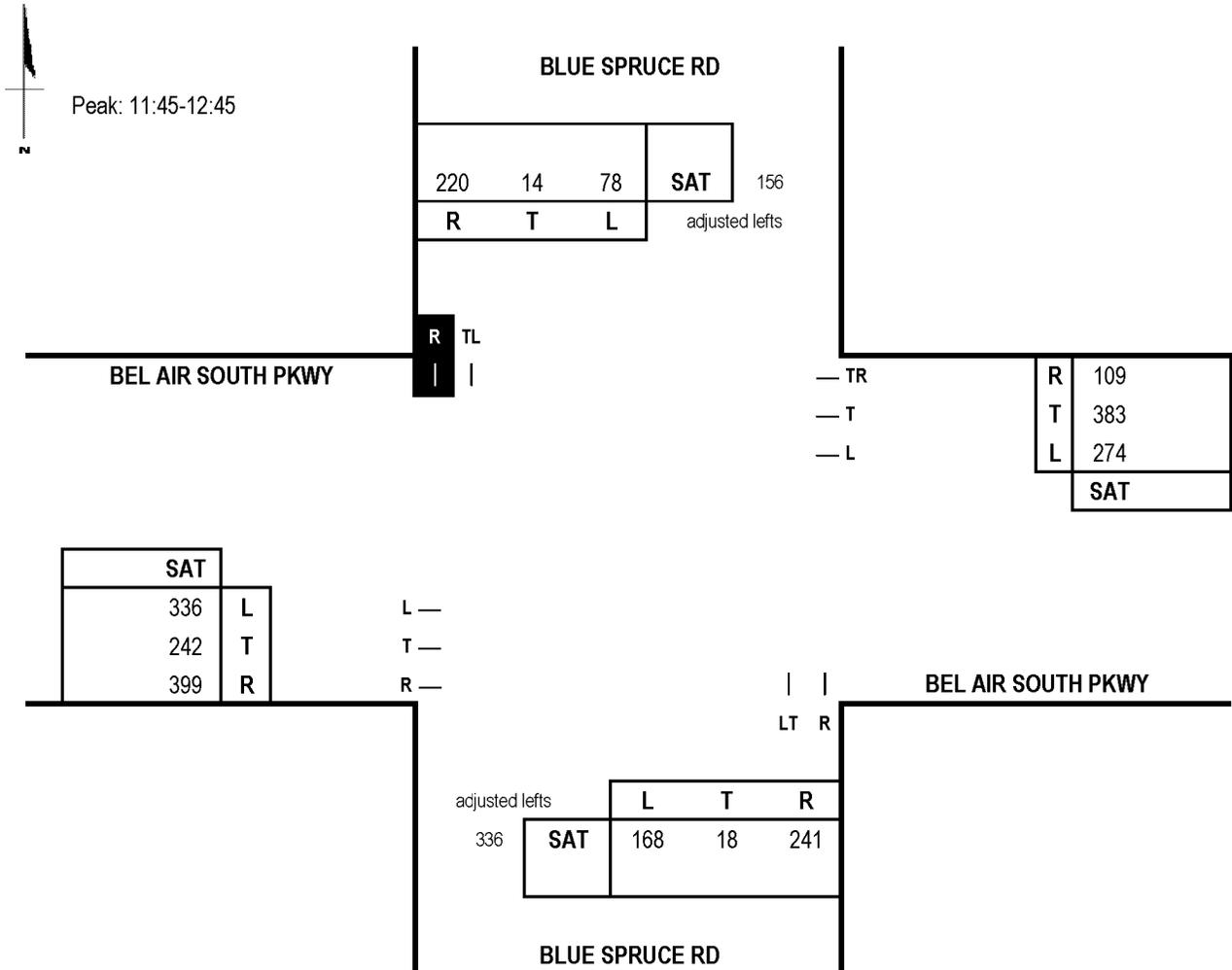
AM VIC = 0.3

PM VIC = 0.6

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bel Air South Pkwy
N/S Road: Blue Spruce Rd
Conditions: Full Acc Total Traffic

Date of Count: 5/12/2012
Day of Count: Saturday
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	354	1.00	354	78	1.00	78	432
SB	170	1.00	170	168	1.00	168	
EB	242	1.00	242	274	1.00	274	607
WB	492	0.55	271	336	1.00	336	
CLV TOTAL=							1,039
Level of Service (LOS)=							B

Scenario ID - TOT12

SAT V/C = 0.65

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

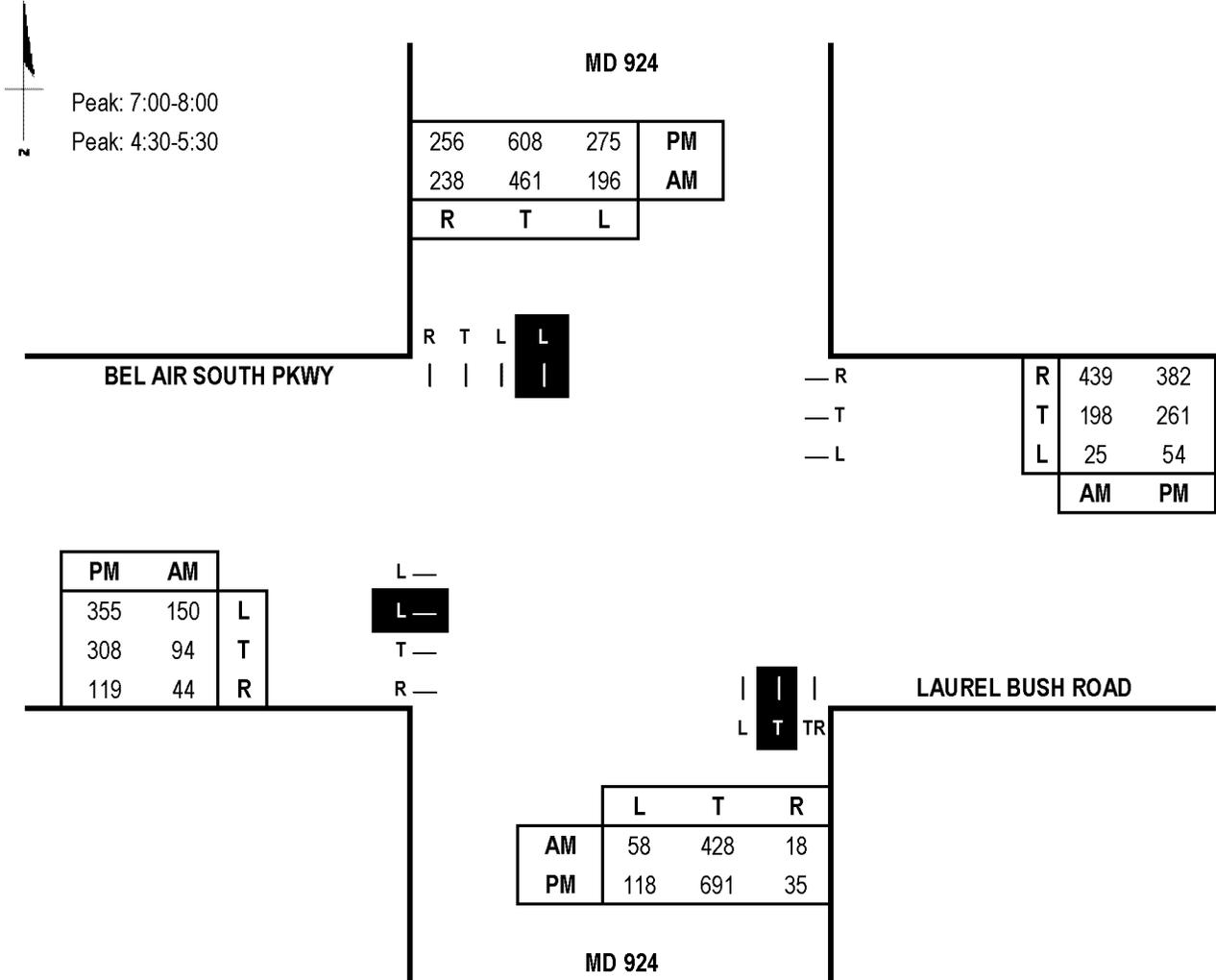
E/W Road: Laurel Bush Road/Bel Air South Pkwy **Date of Count:** 5/10/2012

N/S Road: MD 924

Day of Count: Thursday

Conditions: Full Acc Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	446	0.55	245	196	0.60	118	519
SB	461	1.00	461	58	1.00	58	
EB	94	1.00	94	25	1.00	25	411
WB	321	1.00	321	150	0.60	90	
CLV TOTAL=							930
Level of Service (LOS)=							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	726	0.55	399	275	0.60	165	726
SB	608	1.00	608	118	1.00	118	
EB	308	1.00	308	54	1.00	54	474
WB	261	1.00	261	355	0.60	213	
CLV TOTAL=							1,200
Level of Service (LOS)=							C

Scenario ID - TOT13

AM V/C =0.58

PM V/C =0.75

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

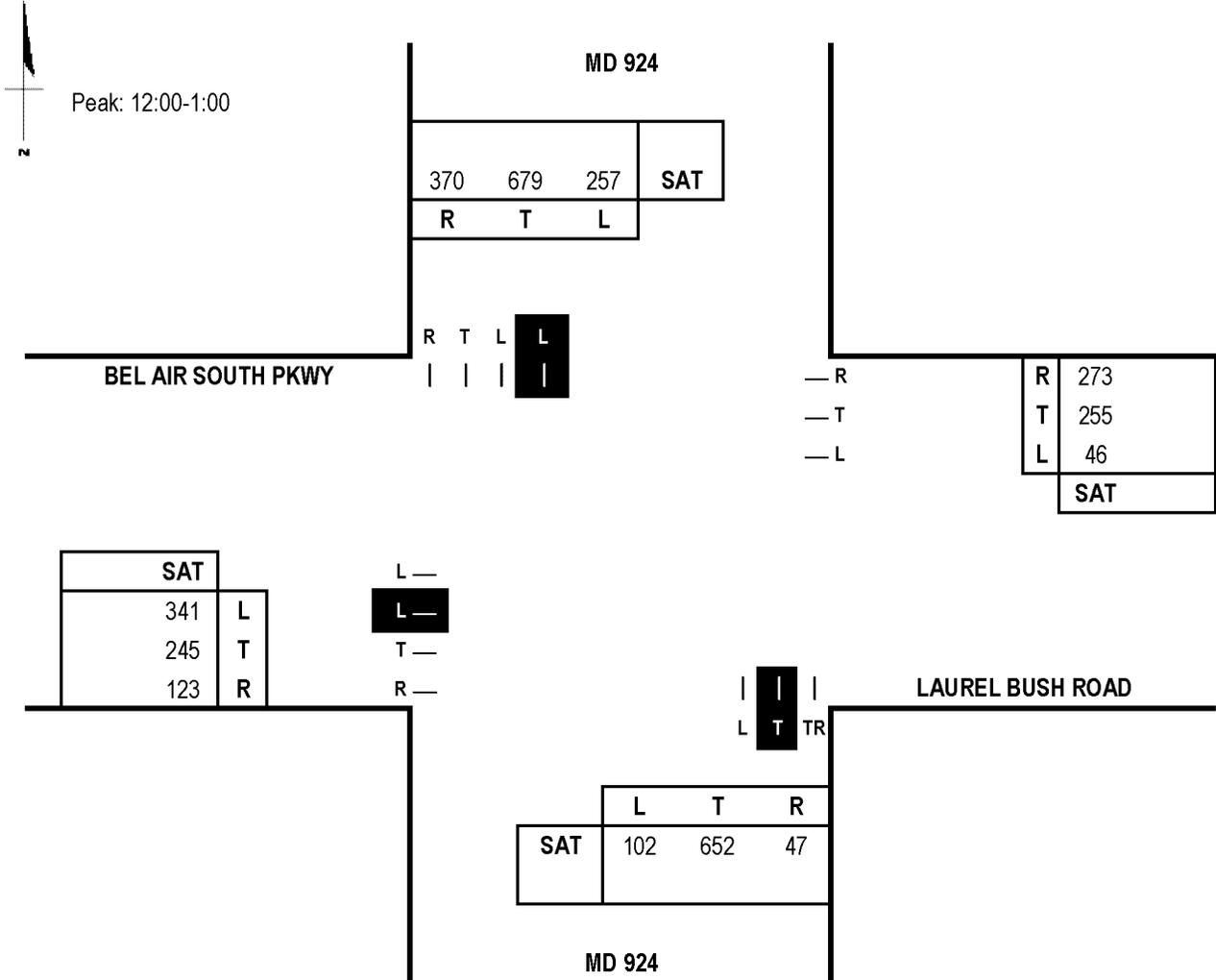
E/W Road: Laurel Bush Road/Bel Air South Pkwy **Date of Count:** 5/5/2012

N/S Road: MD 924

Day of Count: Saturday

Conditions: Full Acc Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	699	0.55	384	257	0.60	154	781
SB	679	1.00	679	102	1.00	102	
EB	245	1.00	245	46	1.00	46	460
WB	255	1.00	255	341	0.60	205	
CLV TOTAL=							1,241
Level of Service (LOS) =							C

Scenario ID - TOT13

SAT V/C = 0.78

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA



E/W Road: Plumtree Road

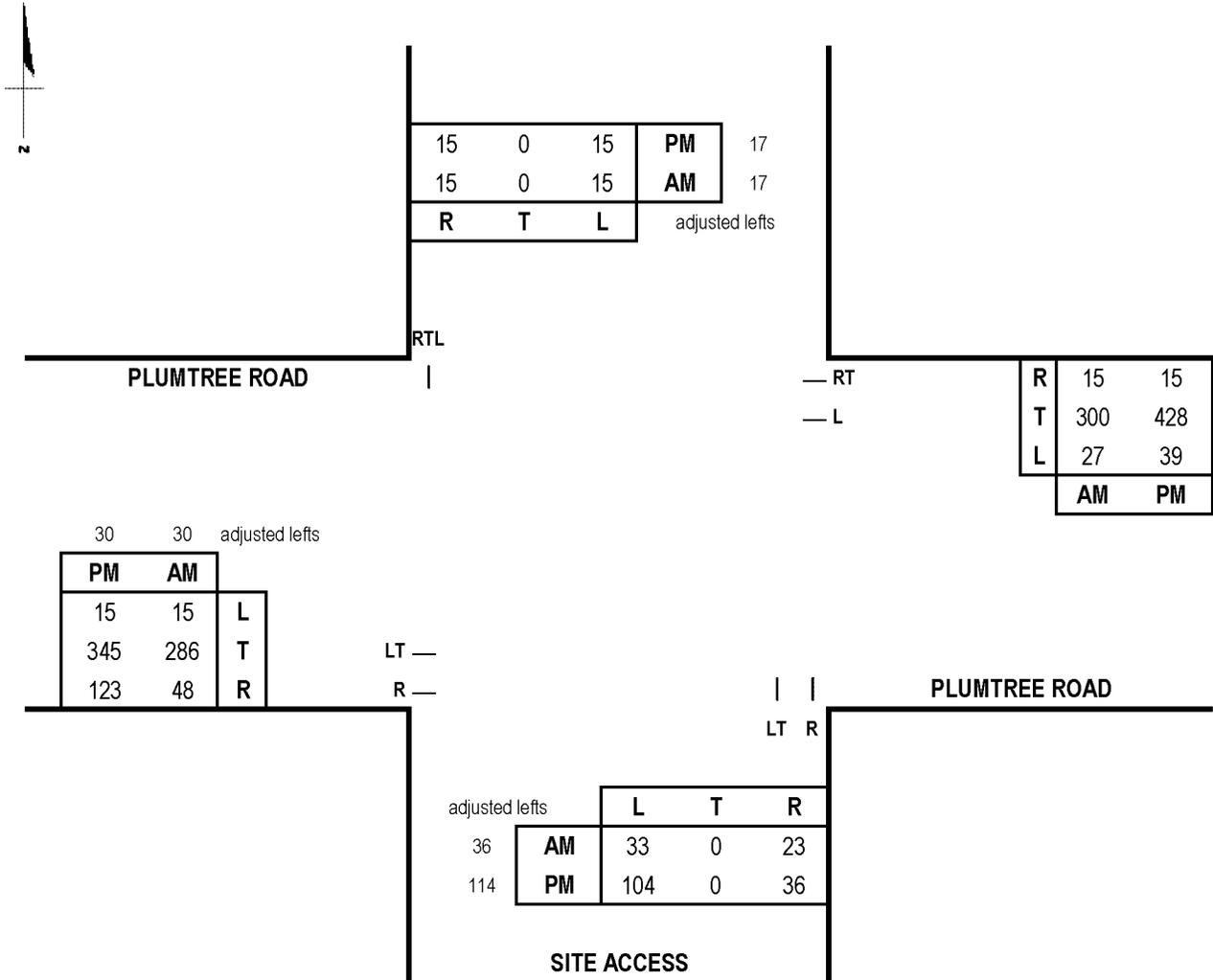
Date of Count:

N/S Road: Site Access

Day of Count:

Conditions: Full Acc Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	36	1.00	36	15	1.00	15	65
SB	32	1.00	32	33	1.00	33	
EB	316	1.00	316	27	1.00	27	343
WB	315	1.00	315	15	1.00	15	
CLV TOTAL=							408
Level of Service (LOS) =							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	114	1.00	114	15	1.00	15	136
SB	32	1.00	32	104	1.00	104	
EB	375	1.00	375	39	1.00	39	458
WB	443	1.00	443	15	1.00	15	
CLV TOTAL=							594
Level of Service (LOS) =							A

Scenario ID - TOT21

AM V/C = 0.26

PM V/C = 0.37

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA



E/W Road: Plumtree Road

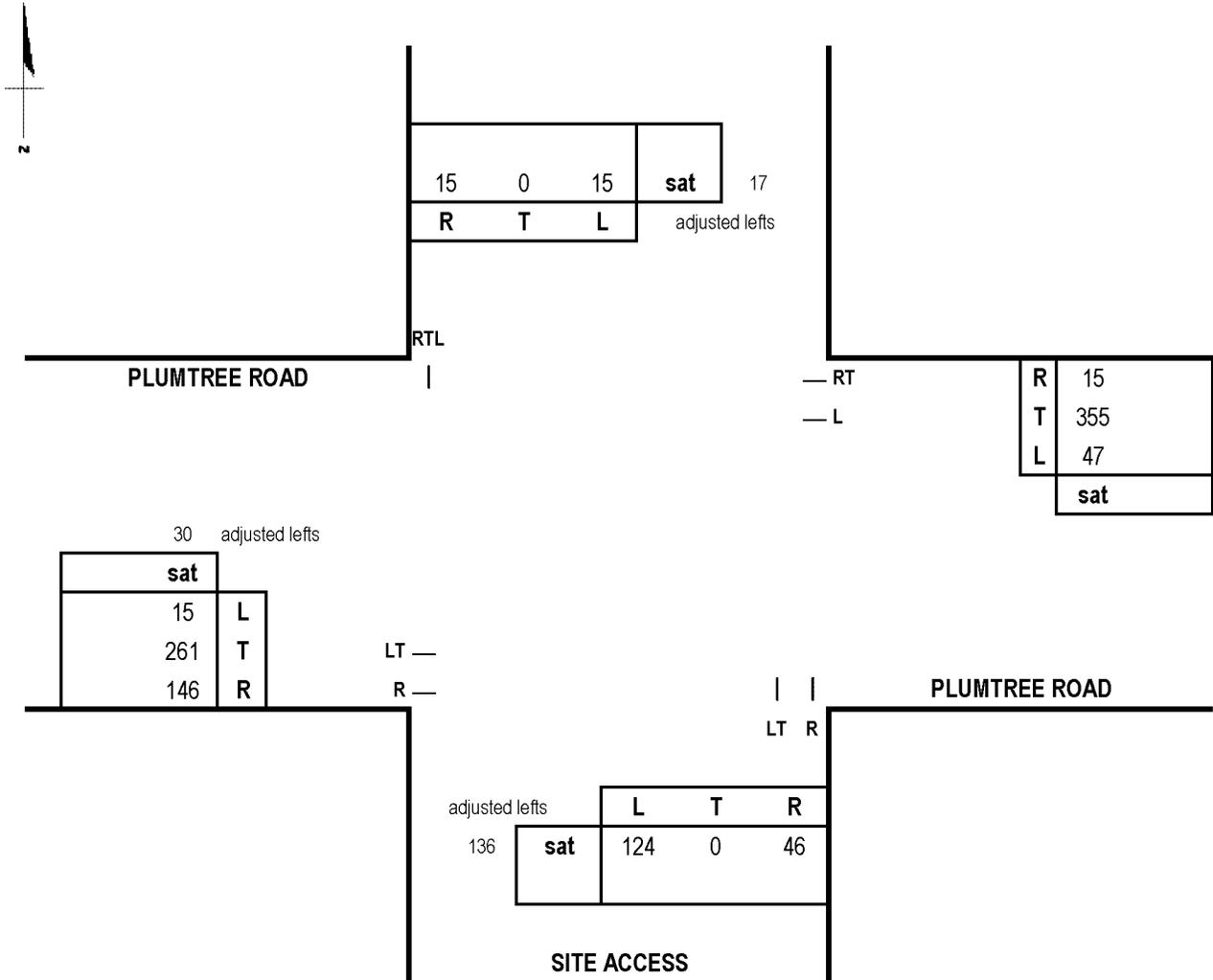
Date of Count:

N/S Road: Site Access

Day of Count:

Conditions: Full Acc Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			sat
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	136	1.00	136	15	1.00	15	156
SB	32	1.00	32	124	1.00	124	
EB	291	1.00	291	47	1.00	47	385
WB	370	1.00	370	15	1.00	15	
CLV TOTAL=							541
Level of Service (LOS) =							A

Scenario ID - TOT21

sat V/C = 0.34

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bright Oaks Drive/Site Access

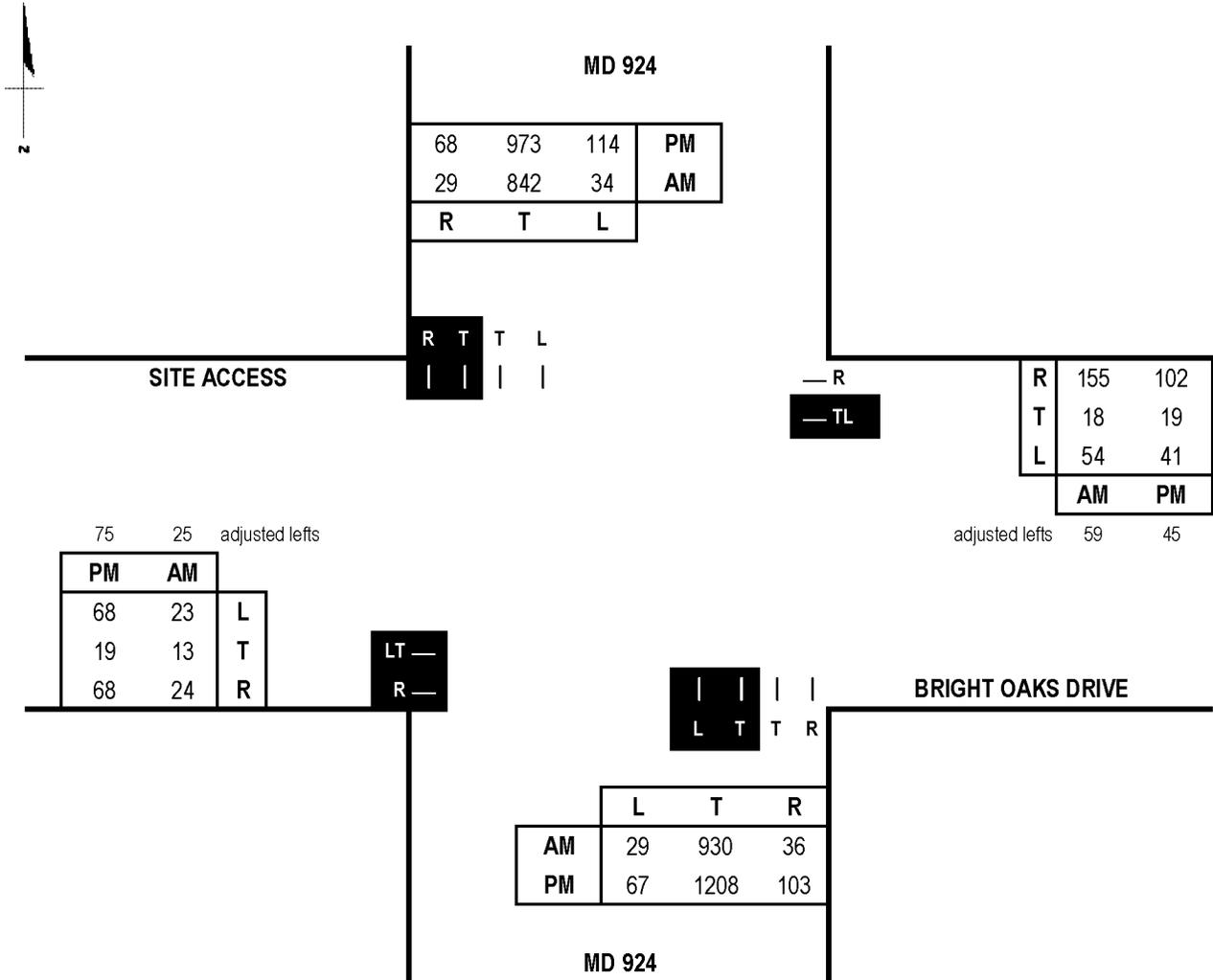
Date of Count: 5/10/2012

N/S Road: MD 924

Day of Count: Thursday

Conditions: Full Acc Total Traffic

Analyst: Qiang Tian



Capacity Analysis

Morning Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			AM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	930	0.55	512	34	1.00	34	546
SB	842	0.55	463	29	1.00	29	
EB	38	1.00	38	54	1.00	54	144
WB	121	1.00	121	23	1.00	23	
CLV TOTAL=							690
Level of Service (LOS)=							A

Evening Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			PM CLV
	VOL	x LUF	= Total	VOL	x LUF	= Total	
NB	1208	0.55	664	114	1.00	114	778
SB	973	0.55	535	67	1.00	67	
EB	94	1.00	94	41	1.00	41	135
WB	64	1.00	64	68	1.00	68	
CLV TOTAL=							913
Level of Service (LOS)=							A

Scenario ID - TOT22

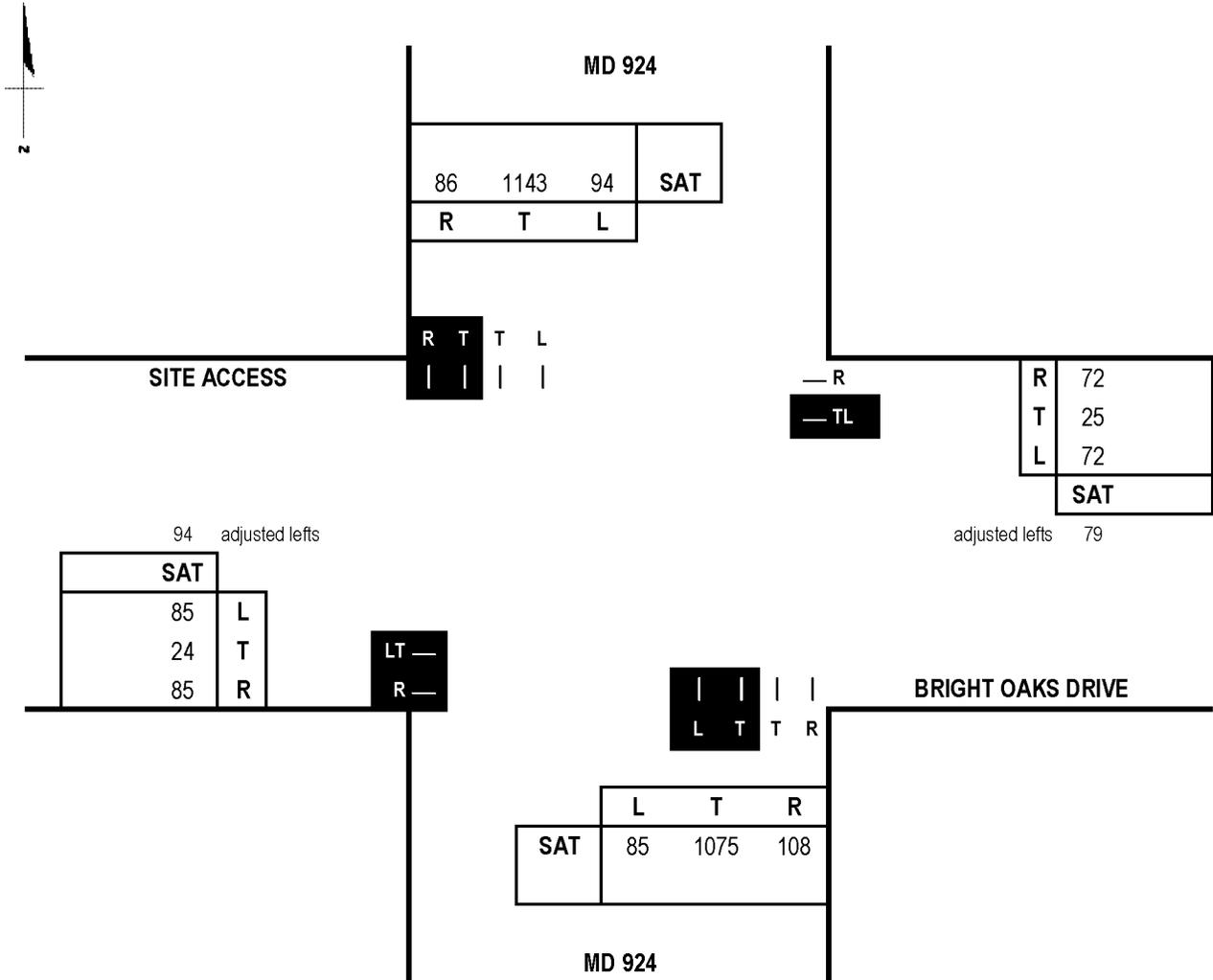
AM V/C = 0.43

PM V/C = 0.57

CRITICAL LANE VOLUME (CLV) METHODOLOGY for MSHA

E/W Road: Bright Oaks Drive/Site Access
N/S Road: MD 924
Conditions: Full Acc Total Traffic

Date of Count: 5/10/2012
Day of Count: Thursday
Analyst: Qiang Tian



Capacity Analysis

Sat. Midday Peak Hour							
Dir	Thru Volumes			+ Opposing Lefts			SAT
	VOL	x LUF	= Total	VOL	x LUF	= Total	CLV
NB	1075	0.55	591	94	1.00	94	714
SB	1143	0.55	629	85	1.00	85	
EB	118	1.00	118	72	1.00	72	190
WB	104	1.00	104	85	1.00	85	
CLV TOTAL=							904
Level of Service (LOS)=							A

Scenario ID - TOT22

SAT V/C = 0.57

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	172	19	74	29	15	18	206	864	13	22	849	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3532		1770	3450	
Flt Permitted	0.58	1.00	1.00	0.74	1.00	1.00	0.21	1.00		0.30	1.00	
Satd. Flow (perm)	1080	1863	1583	1386	1863	1583	394	3532		555	3450	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	177	20	76	30	15	19	212	891	13	23	875	177
RTOR Reduction (vph)	0	0	67	0	0	18	0	1	0	0	8	0
Lane Group Flow (vph)	177	20	9	30	15	1	212	903	0	23	1044	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	25.8	18.2	18.2	8.5	4.9	4.9	112.2	103.4		100.6	96.8	
Effective Green, g (s)	27.8	20.2	18.2	12.5	6.9	6.9	113.2	105.4		102.6	98.8	
Actuated g/C Ratio	0.19	0.13	0.12	0.08	0.05	0.05	0.75	0.70		0.68	0.66	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	287	250	192	129	85	72	401	2481		418	2272	
v/s Ratio Prot	c0.08	0.01		0.01	0.01		c0.04	0.26		0.00	0.30	
v/s Ratio Perm	0.04		0.01	0.01		0.00	c0.36			0.04		
v/c Ratio	0.62	0.08	0.05	0.23	0.18	0.01	0.53	0.36		0.06	0.46	
Uniform Delay, d1	55.3	56.8	58.2	64.1	68.8	68.3	8.1	8.9		7.7	12.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.46	1.48		0.68	1.08	
Incremental Delay, d2	3.9	0.1	0.1	0.9	1.0	0.1	1.2	0.4		0.0	0.6	
Delay (s)	59.2	56.9	58.3	65.0	69.8	68.4	13.0	13.6		5.3	14.1	
Level of Service	E	E	E	E	E	E	B	B		A	B	
Approach Delay (s)		58.8			67.1			13.5			13.9	
Approach LOS		E			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.54	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 14.0
Intersection Capacity Utilization	66.6%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	234	117	109	376	84	51	2	36	36	1	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0	2.0	2.0			2.0	4.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3443			1777	1583		1776	1583
Flt Permitted	0.21	1.00	1.00	0.37	1.00			0.79	1.00		0.80	1.00
Satd. Flow (perm)	398	1863	1583	688	3443			1466	1583		1490	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	158	266	133	124	427	95	58	2	41	41	1	106
RTOR Reduction (vph)	0	0	99	0	28	0	0	0	19	0	0	47
Lane Group Flow (vph)	158	266	34	124	494	0	0	60	22	0	42	59
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	31.5	20.7	20.7	28.1	19.0			48.2	48.2		48.2	48.2
Effective Green, g (s)	35.5	22.7	22.7	32.1	21.0			50.2	48.2		50.2	50.2
Actuated g/C Ratio	0.39	0.25	0.25	0.36	0.23			0.56	0.54		0.56	0.56
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	352	469	399	378	803			817	847		831	882
v/s Ratio Prot	c0.06	0.14		0.04	c0.14							
v/s Ratio Perm	0.11		0.02	0.08				c0.04	0.01		0.03	0.04
v/c Ratio	0.45	0.57	0.08	0.33	0.62			0.07	0.03		0.05	0.07
Uniform Delay, d1	19.1	29.4	25.7	20.4	30.9			9.2	9.8		9.1	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	1.6	0.1	0.5	1.4			0.2	0.1		0.1	0.1
Delay (s)	20.0	30.9	25.8	20.9	32.3			9.4	9.9		9.2	9.3
Level of Service	C	C	C	C	C			A	A		A	A
Approach Delay (s)		26.6			30.1			9.6			9.3	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.26	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 6.0
Intersection Capacity Utilization	40.4%	ICU Level of Service A
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	93	42	25	209	428	76	410	18	197	463	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3517		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.35	1.00		0.44	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	652	3517		1595	1863	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	160	99	45	27	222	455	81	436	19	210	493	253
RTOR Reduction (vph)	0	0	33	0	0	262	0	2	0	0	0	117
Lane Group Flow (vph)	160	99	12	27	222	193	81	453	0	210	493	136
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	11.9	37.8	37.8	3.0	28.9	28.9	85.3	76.5		87.1	77.4	77.4
Effective Green, g (s)	12.9	39.8	39.8	4.0	30.9	28.9	87.3	79.5		89.1	80.4	80.4
Actuated g/C Ratio	0.09	0.27	0.27	0.03	0.21	0.19	0.58	0.53		0.59	0.54	0.54
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	295	494	420	47	383	304	452	1864		1078	998	848
v/s Ratio Prot	c0.05	0.05		0.02	0.12		0.01	0.13		c0.01	c0.26	
v/s Ratio Perm			0.01			c0.12	0.09			0.10		0.09
v/c Ratio	0.54	0.20	0.03	0.57	0.58	0.64	0.18	0.24		0.19	0.49	0.16
Uniform Delay, d1	65.7	42.8	40.8	72.2	53.7	55.7	15.4	19.0		13.4	22.0	17.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.75		0.93	0.75	1.68
Incremental Delay, d2	2.3	0.3	0.0	17.0	2.5	4.8	0.2	0.3		0.1	1.7	0.4
Delay (s)	68.0	43.0	40.8	89.2	56.2	60.6	13.5	14.6		12.5	18.2	30.1
Level of Service	E	D	D	F	E	E	B	B		B	B	C
Approach Delay (s)		55.8			60.3			14.5			20.1	
Approach LOS		E			E			B			C	

Intersection Summary		
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.50	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	59.1%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗	↖	↗	↖		↔	↗		↔	
Volume (vph)	15	286	48	40	300	15	33	0	59	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0	2.0	2.0			2.0	2.0		2.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1858	1583	1770	1850			1770	1583		1695	
Flt Permitted		0.98	1.00	0.31	1.00			0.74	1.00		0.93	
Satd. Flow (perm)		1821	1583	577	1850			1372	1583		1609	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	311	52	43	326	16	36	0	64	16	0	16
RTOR Reduction (vph)	0	0	36	0	4	0	0	0	30	0	15	0
Lane Group Flow (vph)	0	327	16	43	338	0	0	36	34	0	17	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		16.5	16.5	22.1	22.1			29.9	29.9		29.9	
Effective Green, g (s)		18.5	18.5	24.1	24.1			31.9	31.9		31.9	
Actuated g/C Ratio		0.31	0.31	0.40	0.40			0.53	0.53		0.53	
Clearance Time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		561	488	303	743			729	841		855	
v/s Ratio Prot				0.01	c0.18							
v/s Ratio Perm		c0.18	0.01	0.05				c0.03	0.02		0.01	
v/c Ratio		0.58	0.03	0.14	0.45			0.05	0.04		0.02	
Uniform Delay, d1		17.5	14.5	11.7	13.1			6.8	6.7		6.7	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.5	0.0	0.2	0.4			0.1	0.1		0.0	
Delay (s)		19.0	14.5	12.0	13.6			6.9	6.8		6.7	
Level of Service		B	B	B	B			A	A		A	
Approach Delay (s)		18.4			13.4			6.8			6.7	
Approach LOS		B			B			A			A	

Intersection Summary		
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.25	B
Actuated Cycle Length (s)	60.0	Sum of lost time (s)
Intersection Capacity Utilization	48.3%	6.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↖	↖	↖	↖		↕	↖	↖	↕	↖
Volume (vph)	0	0	27	54	0	173	0	930	36	47	842	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		4.0	2.0		2.0	2.0	2.0	2.0	4.0
Lane Util. Factor			1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt			0.86		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1770	1583		3539	1583	1770	3539	1583
Flt Permitted			1.00		0.95	1.00		1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)			1611		1770	1583		3539	1583	440	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	29	59	0	188	0	1011	39	51	915	32
RTOR Reduction (vph)	0	0	26	0	0	162	0	0	11	0	0	7
Lane Group Flow (vph)	0	0	3	0	59	26	0	1011	28	51	915	25
Turn Type			Perm	Perm	NA	Perm		NA	Perm	pm+pt	NA	Perm
Protected Phases					8			2		1	6	
Permitted Phases			4	8		8			2	6		6
Actuated Green, G (s)			8.2		8.2	8.2		51.1	51.1	58.8	58.8	58.8
Effective Green, g (s)			8.2		8.2	10.2		53.1	53.1	60.8	60.8	58.8
Actuated g/C Ratio			0.11		0.11	0.14		0.71	0.71	0.81	0.81	0.78
Clearance Time (s)			4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			176		193	215		2505	1120	457	2868	1241
v/s Ratio Prot								c0.29		0.01	c0.26	
v/s Ratio Perm			0.00		0.03	0.02			0.02	0.08		0.02
v/c Ratio			0.02		0.31	0.12		0.40	0.02	0.11	0.32	0.02
Uniform Delay, d1			29.8		30.8	28.5		4.5	3.3	2.0	1.8	1.8
Progression Factor			1.00		1.00	1.00		1.02	4.29	0.68	0.63	0.93
Incremental Delay, d2			0.0		0.9	0.2		0.4	0.0	0.1	0.3	0.0
Delay (s)			29.8		31.7	28.7		5.0	14.0	1.5	1.4	1.7
Level of Service			C		C	C		A	B	A	A	A
Approach Delay (s)		29.8			29.4			5.4			1.4	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.38	A
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	43.1%	8.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	261	42	187	105	67	49	253	1007	58	41	937	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3510		1770	3470	
Flt Permitted	0.53	1.00	1.00	0.73	1.00	1.00	0.15	1.00		0.23	1.00	
Satd. Flow (perm)	991	1863	1583	1357	1863	1583	288	3510		420	3470	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	275	44	197	111	71	52	266	1060	61	43	986	149
RTOR Reduction (vph)	0	0	166	0	0	48	0	3	0	0	7	0
Lane Group Flow (vph)	275	44	31	111	71	4	266	1118	0	43	1128	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	34.3	23.3	23.3	17.5	10.5	10.5	103.7	94.3		85.8	81.4	
Effective Green, g (s)	36.3	25.3	23.3	21.5	12.5	12.5	104.7	96.3		87.8	83.4	
Actuated g/C Ratio	0.24	0.17	0.16	0.14	0.08	0.08	0.70	0.64		0.59	0.56	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	353	314	245	219	155	131	381	2253		294	1929	
v/s Ratio Prot	c0.11	0.02		0.03	0.04		c0.09	0.32		0.01	0.33	
v/s Ratio Perm	0.08		0.02	0.04		0.00	c0.40			0.08		
v/c Ratio	0.78	0.14	0.12	0.51	0.46	0.03	0.70	0.50		0.15	0.58	
Uniform Delay, d1	51.1	53.1	54.6	58.7	65.5	63.2	16.5	14.1		13.5	21.9	
Progression Factor	0.86	0.88	1.40	1.00	1.00	1.00	1.21	1.02		1.08	0.83	
Incremental Delay, d2	9.9	0.2	0.2	1.8	2.1	0.1	4.9	0.7		0.2	1.0	
Delay (s)	53.7	47.0	76.8	60.6	67.7	63.3	24.9	15.1		14.8	19.3	
Level of Service	D	D	E	E	E	E	C	B		B	B	
Approach Delay (s)		62.0			63.3			16.9			19.1	
Approach LOS		E			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.70	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 14.0
Intersection Capacity Utilization	75.6%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	351	327	227	382	147	149	16	192	54	6	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	6.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.96			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3392			1782	1583		1782	1583
Flt Permitted	0.37	1.00	1.00	0.42	1.00			0.70	1.00		0.69	1.00
Satd. Flow (perm)	689	1863	1583	785	3392			1309	1583		1292	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	254	366	341	236	398	153	155	17	200	56	6	208
RTOR Reduction (vph)	0	0	195	0	43	0	0	0	144	0	0	146
Lane Group Flow (vph)	254	366	146	236	508	0	0	172	56	0	62	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	47.6	36.6	36.6	46.4	36.0			25.0	25.0		25.0	25.0
Effective Green, g (s)	51.6	38.6	38.6	50.4	38.0			27.0	25.0		27.0	27.0
Actuated g/C Ratio	0.57	0.43	0.43	0.56	0.42			0.30	0.28		0.30	0.30
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	551	799	678	575	1432			392	439		387	474
v/s Ratio Prot	c0.07	0.20		0.06	0.15							
v/s Ratio Perm	c0.20		0.09	0.17				c0.13	0.04		0.05	0.04
v/c Ratio	0.46	0.46	0.22	0.41	0.35			0.44	0.13		0.16	0.13
Uniform Delay, d1	9.9	18.3	16.2	10.6	17.7			25.4	24.3		23.2	23.0
Progression Factor	0.80	0.50	0.01	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	1.6	0.6	0.5	0.7			3.5	0.6		0.9	0.6
Delay (s)	8.5	10.7	0.7	11.1	18.4			28.9	24.9		24.0	23.5
Level of Service	A	B	A	B	B			C	C		C	C
Approach Delay (s)		6.6			16.2			26.8			23.7	
Approach LOS		A			B			C			C	

Intersection Summary		
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.46	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	355	305	114	54	281	362	164	645	35	278	613	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3512		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.11	1.00		0.29	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	204	3512		1041	1863	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	390	335	125	59	309	398	180	709	38	305	674	281
RTOR Reduction (vph)	0	0	87	0	0	151	0	3	0	0	0	157
Lane Group Flow (vph)	390	335	38	59	309	247	180	744	0	305	674	124
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	20.2	44.0	44.0	7.2	31.0	31.0	80.0	67.6		71.6	63.4	63.4
Effective Green, g (s)	21.2	46.0	46.0	8.2	33.0	31.0	81.8	70.6		73.6	66.4	66.4
Actuated g/C Ratio	0.14	0.31	0.31	0.05	0.22	0.21	0.55	0.47		0.49	0.44	0.44
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	485	571	485	96	409	327	251	1652		657	824	700
v/s Ratio Prot	c0.11	0.18		0.03	c0.17		c0.06	0.21		0.03	c0.36	
v/s Ratio Perm			0.02			0.16	0.33			0.20		0.08
v/c Ratio	0.80	0.59	0.08	0.61	0.76	0.76	0.72	0.45		0.46	0.82	0.18
Uniform Delay, d1	62.4	44.0	36.9	69.4	54.7	55.9	28.2	26.7		22.2	36.5	25.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	2.12	0.96		1.17	0.99	2.61
Incremental Delay, d2	9.6	1.8	0.1	11.7	8.2	10.2	7.1	0.6		0.6	8.6	0.5
Delay (s)	72.0	45.8	37.0	81.0	63.0	66.1	66.8	26.4		26.5	44.9	66.4
Level of Service	E	D	D	F	E	E	E	C		C	D	E
Approach Delay (s)		56.5			66.0			34.2			45.3	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	49.3	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.79	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	79.6%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔			↔	↔		↔	
Volume (vph)	15	345	123	51	428	15	104	0	123	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1859	1583	1770	1853			1770	1583		1695	
Flt Permitted		0.98	1.00	0.40	1.00			0.74	1.00		0.87	
Satd. Flow (perm)		1818	1583	747	1853			1372	1583		1506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	375	134	55	465	16	113	0	134	16	0	16
RTOR Reduction (vph)	0	0	66	0	1	0	0	0	98	0	23	0
Lane Group Flow (vph)	0	391	68	55	480	0	0	113	36	0	9	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		36.0	36.0	45.0	45.0			18.0	18.0		18.0	
Effective Green, g (s)		38.0	38.0	47.0	47.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.51	0.51	0.63	0.63			0.27	0.27		0.27	
Clearance Time (s)		6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		921	802	536	1161			365	422		401	
v/s Ratio Prot				0.01	c0.26							
v/s Ratio Perm		0.22	0.04	0.06				c0.08	0.02		0.01	
v/c Ratio		0.42	0.08	0.10	0.41			0.31	0.08		0.02	
Uniform Delay, d1		11.6	9.5	6.1	7.1			22.0	20.6		20.3	
Progression Factor		1.00	1.00	0.83	1.03			1.00	1.00		1.00	
Incremental Delay, d2		1.4	0.2	0.1	1.0			2.2	0.4		0.1	
Delay (s)		13.1	9.7	5.2	8.3			24.2	21.0		20.4	
Level of Service		B	A	A	A			C	C		C	
Approach Delay (s)		12.2			7.9			22.5			20.4	
Approach LOS		B			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.41	B
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	59.2%	12.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	76	41	0	121	0	1209	103	133	973	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		4.0	2.0		2.0	2.0	2.0	2.0	4.0
Lane Util. Factor			1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt			0.86		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1770	1583		3539	1583	1770	3539	1583
Flt Permitted			1.00		0.95	1.00		1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)			1611		1770	1583		3539	1583	290	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	82	44	0	130	0	1300	111	143	1046	81
RTOR Reduction (vph)	0	0	75	0	0	115	0	0	34	0	0	16
Lane Group Flow (vph)	0	0	7	0	44	15	0	1300	77	143	1046	65
Turn Type			Perm	Perm	NA	Perm		NA	Perm	pm+pt	NA	Perm
Protected Phases					8			2		1	6	
Permitted Phases			4	8		8			2	6		6
Actuated Green, G (s)			6.4		6.4	6.4		49.7	49.7	60.6	60.6	60.6
Effective Green, g (s)			6.4		6.4	8.4		51.7	51.7	62.6	62.6	60.6
Actuated g/C Ratio			0.09		0.09	0.11		0.69	0.69	0.83	0.83	0.81
Clearance Time (s)			4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			137		151	177		2439	1091	417	2953	1279
v/s Ratio Prot								c0.37		0.04	c0.30	
v/s Ratio Perm			0.00		0.02	0.01			0.05	0.24		0.04
v/c Ratio			0.05		0.29	0.08		0.53	0.07	0.34	0.35	0.05
Uniform Delay, d1			31.5		32.2	29.8		5.7	3.8	3.2	1.5	1.4
Progression Factor			1.00		1.00	1.00		0.78	0.64	2.76	1.06	1.77
Incremental Delay, d2			0.2		1.1	0.2		0.7	0.1	0.4	0.3	0.1
Delay (s)			31.7		33.2	30.0		5.1	2.5	9.4	1.8	2.6
Level of Service			C		C	C		A	A	A	A	A
Approach Delay (s)		31.7			30.9			4.9			2.7	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.48	
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	54.1%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	258	37	199	132	73	73	221	811	70	69	1063	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3497		1770	3461	
Flt Permitted	0.52	1.00	1.00	0.73	1.00	1.00	0.13	1.00		0.29	1.00	
Satd. Flow (perm)	971	1863	1583	1363	1863	1583	238	3497		540	3461	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	269	39	207	138	76	76	230	845	73	72	1107	192
RTOR Reduction (vph)	0	0	183	0	0	69	0	4	0	0	8	0
Lane Group Flow (vph)	269	39	24	138	76	7	230	914	0	72	1291	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	30.3	17.3	17.3	20.3	11.3	11.3	107.7	96.6		93.8	87.7	
Effective Green, g (s)	32.3	19.3	17.3	24.3	13.3	13.3	108.7	98.6		95.8	89.7	
Actuated g/C Ratio	0.22	0.13	0.12	0.16	0.09	0.09	0.72	0.66		0.64	0.60	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	299	239	182	250	165	140	335	2298		403	2069	
v/s Ratio Prot	c0.10	0.02		0.04	0.04		c0.07	0.26		0.01	0.37	
v/s Ratio Perm	0.09		0.02	0.05		0.00	c0.42			0.11		
v/c Ratio	0.90	0.16	0.13	0.55	0.46	0.05	0.69	0.40		0.18	0.62	
Uniform Delay, d1	55.4	58.2	59.6	57.1	64.9	62.6	17.4	11.9		10.3	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.49		0.93	0.87	
Incremental Delay, d2	27.6	0.3	0.3	2.6	2.0	0.1	5.3	0.5		0.1	0.9	
Delay (s)	83.0	58.5	59.9	59.8	67.0	62.7	23.9	18.2		9.7	17.6	
Level of Service	F	E	E	E	E	E	C	B		A	B	
Approach Delay (s)		71.9			62.4			19.4			17.2	
Approach LOS		E			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	30.4	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.71	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 14.0
Intersection Capacity Utilization	78.5%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	336	242	399	274	383	194	168	18	241	67	14	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	6.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3361			1782	1583		1788	1583
Flt Permitted	0.28	1.00	1.00	0.60	1.00			0.69	1.00		0.69	1.00
Satd. Flow (perm)	515	1863	1583	1109	3361			1282	1583		1285	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	346	249	411	282	395	200	173	19	248	69	14	227
RTOR Reduction (vph)	0	0	249	0	65	0	0	0	171	0	0	151
Lane Group Flow (vph)	346	249	162	282	530	0	0	192	77	0	83	76
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	48.3	33.4	33.4	39.7	29.1			28.0	28.0		28.0	28.0
Effective Green, g (s)	52.0	35.4	35.4	43.7	31.1			30.0	28.0		30.0	30.0
Actuated g/C Ratio	0.58	0.39	0.39	0.49	0.35			0.33	0.31		0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	533	732	622	631	1161			427	492		428	527
v/s Ratio Prot	c0.12	0.13		0.06	0.16							
v/s Ratio Perm	c0.25		0.10	0.15				c0.15	0.05		0.06	0.05
v/c Ratio	0.65	0.34	0.26	0.45	0.46			0.45	0.16		0.19	0.14
Uniform Delay, d1	11.5	19.1	18.4	14.2	22.9			23.5	22.5		21.4	21.0
Progression Factor	1.95	0.51	0.53	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	2.3	1.1	0.9	0.5	1.3			3.4	0.7		1.0	0.6
Delay (s)	24.7	10.8	10.6	14.7	24.2			26.9	23.1		22.4	21.6
Level of Service	C	B	B	B	C			C	C		C	C
Approach Delay (s)		15.5			21.1			24.8			21.8	
Approach LOS		B			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.60	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	62.3%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	241	116	46	282	246	159	595	47	261	686	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3501		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.10	1.00		0.34	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	191	3501		1221	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	359	254	122	48	297	259	167	626	49	275	722	389
RTOR Reduction (vph)	0	0	86	0	0	185	0	4	0	0	0	207
Lane Group Flow (vph)	359	254	36	48	297	74	167	671	0	275	722	182
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	19.1	41.8	41.8	6.4	29.1	29.1	83.4	71.9		74.2	67.3	67.3
Effective Green, g (s)	20.1	43.8	43.8	7.4	31.1	29.1	84.8	74.9		76.2	70.3	70.3
Actuated g/C Ratio	0.13	0.29	0.29	0.05	0.21	0.19	0.57	0.50		0.51	0.47	0.47
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	460	543	462	87	386	307	239	1748		736	873	741
v/s Ratio Prot	c0.10	0.14		0.03	c0.16		c0.06	0.19		0.02	c0.39	
v/s Ratio Perm			0.02			0.05	0.34			0.17		0.12
v/c Ratio	0.78	0.47	0.08	0.55	0.77	0.24	0.70	0.38		0.37	0.83	0.25
Uniform Delay, d1	62.8	43.5	38.5	69.7	56.1	51.1	28.0	23.3		20.1	34.6	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	2.21	0.81		1.08	0.90	2.82
Incremental Delay, d2	8.6	0.9	0.1	8.1	9.5	0.6	7.1	0.5		0.4	8.3	0.7
Delay (s)	71.4	44.4	38.6	77.8	65.5	51.7	68.8	19.3		22.2	39.6	68.2
Level of Service	E	D	D	E	E	D	E	B		C	D	E
Approach Delay (s)		56.6			60.6			29.1			44.2	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	46.0	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.80	D
Actuated Cycle Length (s)	150.0	Sum of lost time (s)
Intersection Capacity Utilization	82.8%	16.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔			↔	↔		↔	
Volume (vph)	15	261	146	63	355	15	124	0	155	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1858	1583	1770	1852			1770	1583		1695	
Flt Permitted		0.97	1.00	0.44	1.00			0.74	1.00		0.86	
Satd. Flow (perm)		1809	1583	825	1852			1372	1583		1496	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	284	159	68	386	16	135	0	168	16	0	16
RTOR Reduction (vph)	0	0	91	0	3	0	0	0	118	0	22	0
Lane Group Flow (vph)	0	300	68	68	399	0	0	135	50	0	10	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		23.6	23.6	32.0	32.0			16.0	16.0		16.0	
Effective Green, g (s)		25.6	25.6	34.0	34.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.43	0.43	0.57	0.57			0.30	0.30		0.30	
Clearance Time (s)		6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		771	675	536	1049			411	474		448	
v/s Ratio Prot				0.01	c0.22							
v/s Ratio Perm		0.17	0.04	0.06				c0.10	0.03		0.01	
v/c Ratio		0.39	0.10	0.13	0.38			0.33	0.11		0.02	
Uniform Delay, d1		11.8	10.3	6.3	7.2			16.3	15.2		14.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.5	0.3	0.1	1.1			2.1	0.5		0.1	
Delay (s)		13.3	10.6	6.4	8.2			18.4	15.6		14.9	
Level of Service		B	B	A	A			B	B		B	
Approach Delay (s)		12.4			8.0			16.9			14.9	
Approach LOS		B			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.39	
Actuated Cycle Length (s)	60.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	56.3%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	96	72	0	97	0	1076	108	118	1143	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0		4.0	2.0		2.0	2.0	2.0	2.0	4.0
Lane Util. Factor			1.00		1.00	1.00		0.95	1.00	1.00	0.95	1.00
Frt			0.86		1.00	0.85		1.00	0.85	1.00	1.00	0.85
Flt Protected			1.00		0.95	1.00		1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)			1611		1770	1583		3539	1583	1770	3539	1583
Flt Permitted			1.00		0.95	1.00		1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)			1611		1770	1583		3539	1583	350	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	104	78	0	105	0	1170	117	128	1242	103
RTOR Reduction (vph)	0	0	87	0	0	92	0	0	36	0	0	21
Lane Group Flow (vph)	0	0	17	0	78	13	0	1170	81	128	1242	82
Turn Type			Perm	Perm	NA	Perm		NA	Perm	pm+pt	NA	Perm
Protected Phases					8			2		1	6	
Permitted Phases			4	8		8			2	6		6
Actuated Green, G (s)			7.6		7.6	7.6		49.8	49.8	59.4	59.4	59.4
Effective Green, g (s)			7.6		7.6	9.6		51.8	51.8	61.4	61.4	59.4
Actuated g/C Ratio			0.10		0.10	0.13		0.69	0.69	0.82	0.82	0.79
Clearance Time (s)			4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			163		179	202		2444	1093	430	2897	1253
v/s Ratio Prot								c0.33		0.03	c0.35	
v/s Ratio Perm			0.01		0.04	0.01			0.05	0.21		0.05
v/c Ratio			0.10		0.44	0.07		0.48	0.07	0.30	0.43	0.07
Uniform Delay, d1			30.6		31.7	28.8		5.4	3.8	2.7	1.9	1.7
Progression Factor			1.00		1.00	1.00		0.79	0.87	1.08	1.07	1.91
Incremental Delay, d2			0.3		1.7	0.1		0.6	0.1	0.3	0.4	0.1
Delay (s)			30.9		33.4	28.9		4.8	3.4	3.2	2.4	3.4
Level of Service			C		C	C		A	A	A	A	A
Approach Delay (s)		30.9			30.8			4.7			2.6	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	6.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.46	
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	51.5%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	149	19	61	29	15	18	188	887	13	22	844	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3532		1770	3447	
Flt Permitted	0.58	1.00	1.00	0.74	1.00	1.00	0.21	1.00		0.29	1.00	
Satd. Flow (perm)	1080	1863	1583	1386	1863	1583	398	3532		538	3447	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	154	20	63	30	15	19	194	914	13	23	870	182
RTOR Reduction (vph)	0	0	56	0	0	18	0	1	0	0	8	0
Lane Group Flow (vph)	154	20	7	30	15	1	194	926	0	23	1044	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	25.1	17.5	17.5	8.5	4.9	4.9	112.9	104.1		101.8	98.0	
Effective Green, g (s)	27.1	19.5	17.5	12.5	6.9	6.9	113.9	106.1		103.8	100.0	
Actuated g/C Ratio	0.18	0.13	0.12	0.08	0.05	0.05	0.76	0.71		0.69	0.67	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	278	242	184	129	85	72	401	2498		411	2298	
v/s Ratio Prot	c0.07	0.01		0.01	0.01		c0.04	0.26		0.00	0.30	
v/s Ratio Perm	0.03		0.00	0.01		0.00	c0.33			0.04		
v/c Ratio	0.55	0.08	0.04	0.23	0.18	0.01	0.48	0.37		0.06	0.45	
Uniform Delay, d1	55.2	57.4	58.8	64.1	68.8	68.3	7.5	8.7		7.3	12.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.16		0.67	1.07	
Incremental Delay, d2	2.4	0.1	0.1	0.9	1.0	0.1	0.9	0.4		0.0	0.5	
Delay (s)	57.5	57.5	58.9	65.0	69.8	68.4	8.3	10.5		5.0	13.4	
Level of Service	E	E	E	E	E	E	A	B		A	B	
Approach Delay (s)		57.9			67.1			10.1			13.2	
Approach LOS		E			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.50	B
Actuated Cycle Length (s)	150.0	Sum of lost time (s)
Intersection Capacity Utilization	64.3%	14.0
Analysis Period (min)	15	ICU Level of Service
		C

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	234	117	109	376	55	51	2	36	39	1	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0	2.0	2.0			2.0	4.0		2.0	2.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3472			1777	1583		1776	1583
Flt Permitted	0.23	1.00	1.00	0.35	1.00			0.79	1.00		0.80	1.00
Satd. Flow (perm)	420	1863	1583	657	3472			1463	1583		1482	1583
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	158	266	133	124	427	62	58	2	41	44	1	106
RTOR Reduction (vph)	0	0	101	0	17	0	0	0	19	0	0	46
Lane Group Flow (vph)	158	266	32	124	472	0	0	60	22	0	45	60
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	30.5	19.7	19.7	27.1	18.0			49.2	49.2		49.2	49.2
Effective Green, g (s)	34.5	21.7	21.7	31.1	20.0			51.2	49.2		51.2	51.2
Actuated g/C Ratio	0.38	0.24	0.24	0.35	0.22			0.57	0.55		0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	353	449	381	364	771			832	865		843	900
v/s Ratio Prot	c0.06	c0.14		0.04	0.14							
v/s Ratio Perm	0.11		0.02	0.08				c0.04	0.01		0.03	0.04
v/c Ratio	0.45	0.59	0.08	0.34	0.61			0.07	0.03		0.05	0.07
Uniform Delay, d1	19.7	30.2	26.5	21.1	31.5			8.7	9.4		8.6	8.7
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.9	2.1	0.1	0.6	1.4			0.2	0.1		0.1	0.1
Delay (s)	20.6	32.3	26.5	21.7	33.0			8.9	9.4		8.7	8.8
Level of Service	C	C	C	C	C			A	A		A	A
Approach Delay (s)		27.6			30.7			9.1			8.8	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay		25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio		0.26		
Actuated Cycle Length (s)		90.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization		39.4%	ICU Level of Service	A
Analysis Period (min)		15		
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	94	44	25	198	439	58	428	18	196	461	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3518		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.36	1.00		0.42	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	678	3518		1523	1863	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	160	100	47	27	211	467	62	455	19	209	490	253
RTOR Reduction (vph)	0	0	34	0	0	249	0	1	0	0	0	116
Lane Group Flow (vph)	160	100	13	27	211	218	62	473	0	209	490	137
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	11.9	38.7	38.7	3.0	29.8	29.8	82.9	76.1		87.7	78.5	78.5
Effective Green, g (s)	12.9	40.7	40.7	4.0	31.8	29.8	84.9	79.1		89.7	81.5	81.5
Actuated g/C Ratio	0.09	0.27	0.27	0.03	0.21	0.20	0.57	0.53		0.60	0.54	0.54
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	295	505	429	47	394	314	440	1855		1040	1012	860
v/s Ratio Prot	c0.05	0.05		0.02	0.11		0.01	0.13		c0.01	c0.26	
v/s Ratio Perm			0.01			c0.14	0.07			0.11		0.09
v/c Ratio	0.54	0.20	0.03	0.57	0.54	0.69	0.14	0.25		0.20	0.48	0.16
Uniform Delay, d1	65.7	42.1	40.1	72.2	52.5	55.9	16.0	19.4		13.3	21.2	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.75		0.80	0.69	1.42
Incremental Delay, d2	2.3	0.3	0.0	17.0	1.8	7.0	0.2	0.3		0.1	1.6	0.4
Delay (s)	68.0	42.3	40.2	89.2	54.3	62.8	13.9	14.8		10.8	16.2	24.6
Level of Service	E	D	D	F	D	E	B	B		B	B	C
Approach Delay (s)		55.4			61.3			14.7			17.3	
Approach LOS		E			E			B			B	

Intersection Summary		
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.52	C
Actuated Cycle Length (s)	150.0	Sum of lost time (s)
Intersection Capacity Utilization	59.8%	16.0
Analysis Period (min)	15	ICU Level of Service
		B
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	286	48	27	300	15	33	0	23	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.0	2.0	2.0	2.0			2.0	2.0		2.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1858	1583	1770	1850			1770	1583		1695	
Flt Permitted		0.98	1.00	0.31	1.00			0.74	1.00		0.93	
Satd. Flow (perm)		1821	1583	577	1850			1372	1583		1609	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	311	52	29	326	16	36	0	25	16	0	16
RTOR Reduction (vph)	0	0	36	0	4	0	0	0	12	0	15	0
Lane Group Flow (vph)	0	327	16	29	338	0	0	36	13	0	17	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		16.5	16.5	22.1	22.1			29.9	29.9		29.9	
Effective Green, g (s)		18.5	18.5	24.1	24.1			31.9	31.9		31.9	
Actuated g/C Ratio		0.31	0.31	0.40	0.40			0.53	0.53		0.53	
Clearance Time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		561	488	303	743			729	841		855	
v/s Ratio Prot				0.01	c0.18							
v/s Ratio Perm		c0.18	0.01	0.03				c0.03	0.01		0.01	
v/c Ratio		0.58	0.03	0.10	0.45			0.05	0.02		0.02	
Uniform Delay, d1		17.5	14.5	11.6	13.1			6.8	6.6		6.7	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.5	0.0	0.1	0.4			0.1	0.0		0.0	
Delay (s)		19.0	14.5	11.8	13.6			6.9	6.7		6.7	
Level of Service		B	B	B	B			A	A		A	
Approach Delay (s)		18.4			13.4			6.8			6.7	
Approach LOS		B			B			A			A	

Intersection Summary		
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.25	B
Actuated Cycle Length (s)	60.0	Sum of lost time (s)
Intersection Capacity Utilization	42.4%	6.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	13	24	54	18	155	29	930	36	34	842	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	2.0	4.0	2.0	2.0	2.0	2.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1805	1583		1796	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.79	1.00		0.76	1.00	0.28	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)		1476	1583		1407	1583	525	3539	1583	440	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	14	26	59	20	168	32	1011	39	37	915	32
RTOR Reduction (vph)	0	0	23	0	0	142	0	0	12	0	0	10
Lane Group Flow (vph)	0	39	3	0	79	26	32	1011	27	37	915	22
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		9.4	9.4		9.4	9.4	52.4	49.9	49.9	54.8	51.1	51.1
Effective Green, g (s)		9.4	9.4		9.4	11.4	52.4	51.9	51.9	58.8	53.1	51.1
Actuated g/C Ratio		0.13	0.13		0.13	0.15	0.70	0.69	0.69	0.78	0.71	0.68
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		184	198		176	240	408	2448	1095	446	2505	1078
v/s Ratio Prot							0.00	c0.29		c0.01	0.26	
v/s Ratio Perm		0.03	0.00		c0.06	0.02	0.05		0.02	0.06		0.01
v/c Ratio		0.21	0.02		0.45	0.11	0.08	0.41	0.02	0.08	0.37	0.02
Uniform Delay, d1		29.5	28.7		30.4	27.4	3.6	5.0	3.6	2.4	4.3	3.9
Progression Factor		1.00	1.00		1.00	1.00	1.08	0.94	3.62	0.65	0.73	1.00
Incremental Delay, d2		0.6	0.0		1.8	0.2	0.1	0.5	0.0	0.1	0.4	0.0
Delay (s)		30.0	28.8		32.2	27.6	4.0	5.1	13.1	1.6	3.5	3.9
Level of Service		C	C		C	C	A	A	B	A	A	A
Approach Delay (s)		29.5			29.1			5.4			3.5	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.40	
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	48.6%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	42	168	105	67	49	234	1075	58	41	930	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3512		1770	3466	
Flt Permitted	0.53	1.00	1.00	0.73	1.00	1.00	0.16	1.00		0.20	1.00	
Satd. Flow (perm)	991	1863	1583	1357	1863	1583	301	3512		374	3466	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	203	44	177	111	71	52	246	1132	61	43	979	157
RTOR Reduction (vph)	0	0	151	0	0	48	0	2	0	0	7	0
Lane Group Flow (vph)	203	44	26	111	71	4	246	1191	0	43	1129	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	33.1	22.1	22.1	17.5	10.5	10.5	104.9	95.5		88.7	84.3	
Effective Green, g (s)	35.1	24.1	22.1	21.5	12.5	12.5	105.9	97.5		90.7	86.3	
Actuated g/C Ratio	0.23	0.16	0.15	0.14	0.08	0.08	0.71	0.65		0.60	0.58	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	338	299	233	219	155	131	375	2282		276	1994	
v/s Ratio Prot	c0.08	0.02		0.03	0.04		c0.07	0.34		0.01	0.33	
v/s Ratio Perm	0.06		0.02	c0.04		0.00	c0.39			0.09		
v/c Ratio	0.60	0.15	0.11	0.51	0.46	0.03	0.66	0.52		0.16	0.57	
Uniform Delay, d1	49.8	54.1	55.4	58.7	65.5	63.2	14.6	13.9		12.6	20.1	
Progression Factor	0.83	0.85	1.60	1.00	1.00	1.00	1.25	0.97		1.09	0.84	
Incremental Delay, d2	2.8	0.2	0.2	1.8	2.1	0.1	3.6	0.8		0.2	0.9	
Delay (s)	44.2	46.1	89.1	60.6	67.7	63.3	22.0	14.2		14.0	17.8	
Level of Service	D	D	F	E	E	E	C	B		B	B	
Approach Delay (s)		63.1			63.3			15.5			17.7	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	244	351	327	227	382	80	149	16	192	62	6	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	6.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3448			1782	1583		1781	1583
Flt Permitted	0.41	1.00	1.00	0.42	1.00			0.70	1.00		0.68	1.00
Satd. Flow (perm)	772	1863	1583	785	3448			1297	1583		1265	1583
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	254	366	341	236	398	83	155	17	200	65	6	208
RTOR Reduction (vph)	0	0	195	0	19	0	0	0	144	0	0	146
Lane Group Flow (vph)	254	366	146	236	462	0	0	172	56	0	71	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	47.6	36.6	36.6	46.4	36.0			25.0	25.0		25.0	25.0
Effective Green, g (s)	51.6	38.6	38.6	50.4	38.0			27.0	25.0		27.0	27.0
Actuated g/C Ratio	0.57	0.43	0.43	0.56	0.42			0.30	0.28		0.30	0.30
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	586	799	678	575	1455			389	439		379	474
v/s Ratio Prot	c0.06	c0.20		0.06	0.13							
v/s Ratio Perm	0.19		0.09	0.17				c0.13	0.04		0.06	0.04
v/c Ratio	0.43	0.46	0.22	0.41	0.32			0.44	0.13		0.19	0.13
Uniform Delay, d1	9.8	18.3	16.2	10.6	17.3			25.4	24.3		23.4	23.0
Progression Factor	0.78	0.50	0.01	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.5	1.6	0.6	0.5	0.6			3.6	0.6		1.1	0.6
Delay (s)	8.1	10.7	0.7	11.1	17.9			29.0	24.9		24.5	23.5
Level of Service	A	B	A	B	B			C	C		C	C
Approach Delay (s)		6.5			15.7			26.8			23.8	
Approach LOS		A			B			C			C	

Intersection Summary		
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.45	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	355	308	119	54	261	382	118	691	35	275	608	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3514		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.13	1.00		0.26	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	239	3514		936	1863	1583
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	390	338	131	59	287	420	130	759	38	302	668	281
RTOR Reduction (vph)	0	0	91	0	0	138	0	2	0	0	0	154
Lane Group Flow (vph)	390	338	40	59	287	282	130	795	0	302	668	127
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	20.2	44.3	44.3	7.2	31.3	31.3	78.4	67.8		72.6	64.9	64.9
Effective Green, g (s)	21.2	46.3	46.3	8.2	33.3	31.3	80.4	70.8		74.6	67.9	67.9
Actuated g/C Ratio	0.14	0.31	0.31	0.05	0.22	0.21	0.54	0.47		0.50	0.45	0.45
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	485	575	488	96	413	330	246	1658		610	843	716
v/s Ratio Prot	c0.11	0.18		0.03	0.15		c0.04	0.23		0.03	c0.36	
v/s Ratio Perm			0.03			c0.18	0.24			0.22		0.08
v/c Ratio	0.80	0.59	0.08	0.61	0.69	0.85	0.53	0.48		0.50	0.79	0.18
Uniform Delay, d1	62.4	43.8	36.8	69.4	53.7	57.1	26.4	27.0		22.1	35.0	24.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.67	0.95		0.99	0.92	2.64
Incremental Delay, d2	9.6	1.8	0.1	11.7	5.4	19.4	1.7	0.7		0.7	7.2	0.5
Delay (s)	72.0	45.6	36.9	81.0	59.1	76.5	45.9	26.5		22.6	39.3	64.9
Level of Service	E	D	D	F	E	E	D	C		C	D	E
Approach Delay (s)		56.3			70.3			29.2			41.0	
Approach LOS		E			E			C			D	

Intersection Summary		
HCM 2000 Control Delay	47.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.77	
Actuated Cycle Length (s)	150.0	Sum of lost time (s)
Intersection Capacity Utilization	75.7%	ICU Level of Service
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗	↖	↗	↖		↔	↗		↔	
Volume (vph)	15	345	123	39	428	15	104	0	36	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	1.00			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1859	1583	1770	1853			1770	1583		1695	
Flt Permitted		0.98	1.00	0.40	1.00			0.74	1.00		0.87	
Satd. Flow (perm)		1818	1583	747	1853			1372	1583		1506	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	375	134	42	465	16	113	0	39	16	0	16
RTOR Reduction (vph)	0	0	66	0	1	0	0	0	29	0	23	0
Lane Group Flow (vph)	0	391	68	42	480	0	0	113	10	0	9	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		36.0	36.0	45.0	45.0			18.0	18.0		18.0	
Effective Green, g (s)		38.0	38.0	47.0	47.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.51	0.51	0.63	0.63			0.27	0.27		0.27	
Clearance Time (s)		6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		921	802	536	1161			365	422		401	
v/s Ratio Prot				0.01	c0.26							
v/s Ratio Perm		0.22	0.04	0.04				c0.08	0.01		0.01	
v/c Ratio		0.42	0.08	0.08	0.41			0.31	0.02		0.02	
Uniform Delay, d1		11.6	9.5	6.1	7.1			22.0	20.3		20.3	
Progression Factor		1.00	1.00	0.82	1.06			1.00	1.00		1.00	
Incremental Delay, d2		1.4	0.2	0.1	1.0			2.2	0.1		0.1	
Delay (s)		13.1	9.7	5.1	8.5			24.2	20.4		20.4	
Level of Service		B	A	A	A			C	C		C	
Approach Delay (s)		12.2			8.2			23.2			20.4	
Approach LOS		B			A			C			C	

Intersection Summary		
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.41	B
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	49.2%	12.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↗		↔	↗	↖	↑↑	↖	↖	↑↑	↖
Volume (vph)	68	19	68	41	19	102	67	1208	103	114	973	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	2.0	4.0	2.0	2.0	2.0	2.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1792	1583		1801	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.73	1.00		0.74	1.00	0.23	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)		1359	1583		1375	1583	423	3539	1583	293	3539	1583
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	73	20	73	44	20	110	72	1299	111	123	1046	73
RTOR Reduction (vph)	0	0	64	0	0	94	0	0	36	0	0	25
Lane Group Flow (vph)	0	93	9	0	64	16	72	1299	75	123	1046	48
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		9.1	9.1		9.1	9.1	53.6	48.6	48.6	54.2	48.9	48.9
Effective Green, g (s)		9.1	9.1		9.1	11.1	53.6	50.6	50.6	58.2	50.9	48.9
Actuated g/C Ratio		0.12	0.12		0.12	0.15	0.71	0.67	0.67	0.78	0.68	0.65
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		164	192		166	234	392	2387	1067	371	2401	1032
v/s Ratio Prot							0.01	c0.37		c0.03	0.30	
v/s Ratio Perm		c0.07	0.01		0.05	0.01	0.12		0.05	0.23		0.03
v/c Ratio		0.57	0.05		0.39	0.07	0.18	0.54	0.07	0.33	0.44	0.05
Uniform Delay, d1		31.1	29.1		30.4	27.5	3.7	6.3	4.2	3.7	5.5	4.7
Progression Factor		1.00	1.00		1.00	1.00	0.93	0.86	0.65	1.67	0.84	1.24
Incremental Delay, d2		4.4	0.1		1.5	0.1	0.2	0.7	0.1	0.5	0.5	0.1
Delay (s)		35.5	29.2		31.9	27.6	3.6	6.0	2.8	6.6	5.1	5.9
Level of Service		D	C		C	C	A	A	A	A	A	A
Approach Delay (s)		32.8			29.2			5.7			5.3	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.53	A
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	61.1%	10.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	173	37	175	132	73	73	196	896	70	69	1054	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	4.0	6.0	2.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3501		1770	3457	
Flt Permitted	0.52	1.00	1.00	0.73	1.00	1.00	0.13	1.00		0.25	1.00	
Satd. Flow (perm)	971	1863	1583	1363	1863	1583	248	3501		471	3457	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	180	39	182	138	76	76	204	933	73	72	1098	201
RTOR Reduction (vph)	0	0	162	0	0	69	0	4	0	0	8	0
Lane Group Flow (vph)	180	39	20	138	76	7	204	1002	0	72	1291	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4		4	8		8	6			2		
Actuated Green, G (s)	29.8	16.8	16.8	20.3	11.3	11.3	108.2	97.1		96.2	90.1	
Effective Green, g (s)	31.8	18.8	16.8	24.3	13.3	13.3	109.2	99.1		98.2	92.1	
Actuated g/C Ratio	0.21	0.13	0.11	0.16	0.09	0.09	0.73	0.66		0.65	0.61	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	293	233	177	250	165	140	323	2312		369	2122	
v/s Ratio Prot	c0.07	0.02		0.04	0.04		c0.06	0.29		0.01	0.37	
v/s Ratio Perm	0.06		0.01	c0.05		0.00	c0.40			0.12		
v/c Ratio	0.61	0.17	0.12	0.55	0.46	0.05	0.63	0.43		0.20	0.61	
Uniform Delay, d1	51.9	58.6	59.9	57.1	64.9	62.6	14.9	12.1		9.7	17.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.88	1.08		0.93	0.86	
Incremental Delay, d2	3.8	0.3	0.3	2.6	2.0	0.1	3.5	0.5		0.2	0.8	
Delay (s)	55.7	58.9	60.2	59.8	67.0	62.7	16.6	13.5		9.2	16.2	
Level of Service	E	E	E	E	E	E	B	B		A	B	
Approach Delay (s)		58.1			62.4			14.1			15.9	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	336	242	399	274	383	109	168	18	241	78	14	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0	6.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95			1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.97			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	1863	1583	1770	3422			1782	1583		1787	1583
Flt Permitted	0.33	1.00	1.00	0.60	1.00			0.68	1.00		0.67	1.00
Satd. Flow (perm)	614	1863	1583	1109	3422			1268	1583		1255	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	346	249	411	282	395	112	173	19	248	80	14	227
RTOR Reduction (vph)	0	0	249	0	27	0	0	0	171	0	0	151
Lane Group Flow (vph)	346	249	162	282	480	0	0	192	77	0	94	76
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	48.3	33.4	33.4	39.7	29.1			28.0	28.0		28.0	28.0
Effective Green, g (s)	52.0	35.4	35.4	43.7	31.1			30.0	28.0		30.0	30.0
Actuated g/C Ratio	0.58	0.39	0.39	0.49	0.35			0.33	0.31		0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0		6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	571	732	622	631	1182			422	492		418	527
v/s Ratio Prot	c0.11	0.13		0.06	0.14							
v/s Ratio Perm	c0.24		0.10	0.15				c0.15	0.05		0.07	0.05
v/c Ratio	0.61	0.34	0.26	0.45	0.41			0.45	0.16		0.22	0.14
Uniform Delay, d1	10.9	19.1	18.4	14.2	22.4			23.6	22.5		21.6	21.0
Progression Factor	1.68	0.51	0.53	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.6	1.1	0.9	0.5	1.0			3.5	0.7		1.2	0.6
Delay (s)	20.0	10.8	10.6	14.7	23.5			27.1	23.1		22.9	21.6
Level of Service	B	B	B	B	C			C	C		C	C
Approach Delay (s)		13.9			20.3			24.9			22.0	
Approach LOS		B			C			C			C	

Intersection Summary		
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.57	
Actuated Cycle Length (s)	90.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	341	245	123	46	255	273	102	652	47	257	679	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1863	1583	1770	3504		3433	1863	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.13	1.00		0.30	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1770	1863	1583	244	3504		1087	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	359	258	129	48	268	287	107	686	49	271	715	389
RTOR Reduction (vph)	0	0	92	0	0	166	0	3	0	0	0	199
Lane Group Flow (vph)	359	258	37	48	268	121	107	732	0	271	715	190
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6			2		2
Actuated Green, G (s)	19.1	40.5	40.5	6.4	27.8	27.8	82.7	72.8		77.5	70.2	70.2
Effective Green, g (s)	20.1	42.5	42.5	7.4	29.8	27.8	84.7	75.8		79.5	73.2	73.2
Actuated g/C Ratio	0.13	0.28	0.28	0.05	0.20	0.19	0.56	0.51		0.53	0.49	0.49
Clearance Time (s)	5.0	6.0	6.0	5.0	6.0	6.0	5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.5	4.0	4.0	3.5	4.0	4.0	3.5	6.0		3.5	6.0	6.0
Lane Grp Cap (vph)	460	527	448	87	370	293	248	1770		705	909	772
v/s Ratio Prot	c0.10	0.14		0.03	c0.14		c0.03	0.21		0.02	c0.38	
v/s Ratio Perm			0.02			0.08	0.21			0.18		0.12
v/c Ratio	0.78	0.49	0.08	0.55	0.72	0.41	0.43	0.41		0.38	0.79	0.25
Uniform Delay, d1	62.8	44.7	39.4	69.7	56.3	53.9	24.6	23.2		18.8	31.9	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.32	0.73		0.82	0.76	2.45
Incremental Delay, d2	8.6	1.0	0.1	8.1	7.3	1.3	1.1	0.6		0.4	6.1	0.7
Delay (s)	71.4	45.7	39.5	77.8	63.6	55.2	33.6	17.5		15.7	30.3	55.4
Level of Service	E	D	D	E	E	E	C	B		B	C	E
Approach Delay (s)		57.0			60.7			19.6			34.5	
Approach LOS		E			E			B			C	

Intersection Summary		
HCM 2000 Control Delay	40.1	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.74	
Actuated Cycle Length (s)	150.0	Sum of lost time (s) 16.0
Intersection Capacity Utilization	77.9%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔			↔	↔		↔	
Volume (vph)	15	261	146	47	355	15	124	0	46	15	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Frt		1.00	0.85	1.00	0.99			1.00	0.85		0.93	
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.98	
Satd. Flow (prot)		1858	1583	1770	1852			1770	1583		1695	
Flt Permitted		0.97	1.00	0.44	1.00			0.74	1.00		0.86	
Satd. Flow (perm)		1809	1583	825	1852			1372	1583		1496	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	284	159	51	386	16	135	0	50	16	0	16
RTOR Reduction (vph)	0	0	91	0	3	0	0	0	35	0	22	0
Lane Group Flow (vph)	0	300	68	51	399	0	0	135	15	0	10	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)		23.6	23.6	32.0	32.0			16.0	16.0		16.0	
Effective Green, g (s)		25.6	25.6	34.0	34.0			18.0	18.0		18.0	
Actuated g/C Ratio		0.43	0.43	0.57	0.57			0.30	0.30		0.30	
Clearance Time (s)		6.0	6.0	6.0	6.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		771	675	536	1049			411	474		448	
v/s Ratio Prot				0.01	c0.22							
v/s Ratio Perm		0.17	0.04	0.05				c0.10	0.01		0.01	
v/c Ratio		0.39	0.10	0.10	0.38			0.33	0.03		0.02	
Uniform Delay, d1		11.8	10.3	6.2	7.2			16.3	14.8		14.8	
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		1.5	0.3	0.1	1.1			2.1	0.1		0.1	
Delay (s)		13.3	10.6	6.3	8.2			18.4	15.0		14.9	
Level of Service		B	B	A	A			B	B		B	
Approach Delay (s)		12.4			8.0			17.5			14.9	
Approach LOS		B			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.39	
Actuated Cycle Length (s)	60.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	56.3%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	24	85	72	25	72	85	1075	108	94	1143	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	2.0	4.0	2.0	2.0	2.0	2.0	4.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1793	1583		1796	1583	1770	3539	1583	1770	3539	1583
Flt Permitted		0.70	1.00		0.67	1.00	0.19	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)		1311	1583		1247	1583	349	3539	1583	295	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	26	92	78	27	78	92	1168	117	102	1242	93
RTOR Reduction (vph)	0	0	79	0	0	65	0	0	48	0	0	34
Lane Group Flow (vph)	0	118	13	0	105	13	92	1168	69	102	1242	59
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)		10.3	10.3		10.3	10.3	47.3	42.2	42.2	56.7	47.6	47.6
Effective Green, g (s)		10.3	10.3		10.3	12.3	47.3	44.2	44.2	58.7	49.6	47.6
Actuated g/C Ratio		0.14	0.14		0.14	0.16	0.63	0.59	0.59	0.78	0.66	0.63
Clearance Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		180	217		171	259	316	2085	932	476	2340	1004
v/s Ratio Prot							c0.02	0.33		0.04	c0.35	
v/s Ratio Perm		c0.09	0.01		0.08	0.01	0.16		0.04	0.13		0.04
v/c Ratio		0.66	0.06		0.61	0.05	0.29	0.56	0.07	0.21	0.53	0.06
Uniform Delay, d1		30.7	28.1		30.5	26.4	5.8	9.4	6.6	4.1	6.6	5.2
Progression Factor		1.00	1.00		1.00	1.00	0.78	0.77	0.93	0.81	0.71	1.09
Incremental Delay, d2		8.3	0.1		6.4	0.1	0.4	0.9	0.1	0.8	0.7	0.1
Delay (s)		39.0	28.2		36.9	26.5	5.0	8.2	6.3	4.2	5.4	5.8
Level of Service		D	C		D	C	A	A	A	A	A	A
Approach Delay (s)		34.3			32.5			7.9			5.3	
Approach LOS		C			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.53	A
Actuated Cycle Length (s)	75.0	Sum of lost time (s)
Intersection Capacity Utilization	58.9%	10.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	272	60	80	90	57	35	204	253	254	53	276	338
Average Queue (ft)	153	19	33	28	16	13	82	115	105	11	90	165
95th Queue (ft)	243	48	61	66	43	35	152	215	207	36	217	321
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	2			0								
Queuing Penalty (veh)	0			0								

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	174	255	75	129	251	187	62	51	56	68
Average Queue (ft)	72	123	35	53	132	79	23	12	15	27
95th Queue (ft)	129	218	62	101	225	157	57	37	46	58
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	0	5			0					
Queuing Penalty (veh)	1	7			0					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	148	138	159	79	170	312	237	106	134	123	77	83
Average Queue (ft)	69	64	61	18	34	162	123	43	68	61	27	48
95th Queue (ft)	125	120	129	51	100	271	211	83	123	115	62	79
Link Distance (ft)			582	582		1686			1672			744
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)							19					
Queuing Penalty (veh)							88					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	337	126
Average Queue (ft)	162	48
95th Queue (ft)	288	104
Link Distance (ft)	744	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		480
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	254	66	52	213	47	56	39
Average Queue (ft)	133	23	19	103	12	22	10
95th Queue (ft)	225	54	43	170	39	51	34
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)						200	
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	LT	R	T	T	R	L	T	T	R
Maximum Queue (ft)	30	88	96	144	113	37	56	71	314	19
Average Queue (ft)	10	38	43	46	34	3	20	11	53	2
95th Queue (ft)	26	76	79	107	84	19	46	43	191	12
Link Distance (ft)	235	1255		744	744			818	818	818
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			170			160	250			
Storage Blk Time (%)										
Queuing Penalty (veh)										

Zone Summary

Zone wide Queuing Penalty: 97

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	336	423	140	170	149	65	316	384	295	62	376	449
Average Queue (ft)	230	85	56	85	65	25	128	226	156	24	183	247
95th Queue (ft)	357	327	104	146	121	54	248	349	279	56	312	386
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	19	0		5	2		0	2			0	
Queuing Penalty (veh)	8	0		6	4		2	4			0	

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	162	183	104	198	253	275	333	268	219	259
Average Queue (ft)	80	84	50	93	106	113	152	100	41	83
95th Queue (ft)	134	154	90	161	229	224	384	320	155	222
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)							10	6		
Queuing Penalty (veh)							0	0		
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	1	1			2				0	2
Queuing Penalty (veh)	2	3			4				0	1

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	261	240	357	114	203	449	362	213	271	266	140	142
Average Queue (ft)	164	144	190	48	65	237	132	115	165	157	69	83
95th Queue (ft)	244	220	314	101	164	384	253	187	257	242	119	129
Link Distance (ft)			582	582		1686			1673			744
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)					2	36						
Queuing Penalty (veh)					11	151						

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	501	196
Average Queue (ft)	312	67
95th Queue (ft)	478	147
Link Distance (ft)	744	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		480
Storage Blk Time (%)	2	
Queuing Penalty (veh)	4	

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	318	119	198	375	144	91	65
Average Queue (ft)	121	32	29	137	55	40	16
95th Queue (ft)	249	75	169	437	112	76	47
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)			0	1			
Queuing Penalty (veh)			0	3			
Storage Bay Dist (ft)						200	
Storage Blk Time (%)					0		
Queuing Penalty (veh)					0		

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	LT	R	T	T	R	L	T	T	R
Maximum Queue (ft)	82	67	89	198	154	49	136	94	201	20
Average Queue (ft)	25	25	34	91	46	12	58	19	56	5
95th Queue (ft)	53	54	67	180	114	35	106	63	151	18
Link Distance (ft)	235	1255		744	744			818	818	818
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			170			160	250			
Storage Blk Time (%)					0					
Queuing Penalty (veh)					0					

Zone Summary

Zone wide Queuing Penalty: 206

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	350	766	351	198	188	60	311	305	290	88	440	484
Average Queue (ft)	327	502	77	107	78	30	125	192	162	32	200	301
95th Queue (ft)	420	919	244	180	156	53	234	289	259	65	349	447
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)		8		0	0							
Queuing Penalty (veh)		17		0	0							
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	78			12	3		0	0				
Queuing Penalty (veh)	29			18	6		1	1				

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	249	325	174	226	248	312	161	119	111	112
Average Queue (ft)	136	100	70	104	108	134	88	52	40	53
95th Queue (ft)	236	233	134	184	201	245	146	90	82	88
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	11	1		0	0					
Queuing Penalty (veh)	26	4		0	0					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	256	231	286	133	230	453	140	206	235	228	128	368
Average Queue (ft)	148	141	154	49	71	251	72	104	130	127	57	84
95th Queue (ft)	219	206	257	101	187	429	118	179	212	212	106	214
Link Distance (ft)			582	582		1686			1673			744
Upstream Blk Time (%)												0
Queuing Penalty (veh)												0
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)					0	39						
Queuing Penalty (veh)					0	113						

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	689	509
Average Queue (ft)	417	163
95th Queue (ft)	618	414
Link Distance (ft)	744	
Upstream Blk Time (%)	1	
Queuing Penalty (veh)	5	
Storage Bay Dist (ft)		480
Storage Blk Time (%)	7	
Queuing Penalty (veh)	27	

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	371	221	65	194	100	156	52
Average Queue (ft)	123	46	23	89	50	56	18
95th Queue (ft)	347	212	52	166	89	118	45
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)	0	0					
Queuing Penalty (veh)	0	0					
Storage Bay Dist (ft)						200	
Storage Blk Time (%)						0	
Queuing Penalty (veh)						0	

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	R	LT	R	T	T	R	L	T	T	R
Maximum Queue (ft)	98	105	83	167	139	52	99	246	501	28
Average Queue (ft)	36	42	30	64	45	11	44	37	135	8
95th Queue (ft)	73	81	63	141	107	35	80	140	335	24
Link Distance (ft)	235	1255		744	744			818	818	818
Upstream Blk Time (%)									0	
Queuing Penalty (veh)									0	
Storage Bay Dist (ft)			170			160	250			
Storage Blk Time (%)		0			0					
Queuing Penalty (veh)		0			0					

Zone Summary

Zone wide Queuing Penalty: 250

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	252	128	70	80	79	43	188	272	230	48	280	372
Average Queue (ft)	131	24	30	27	20	14	81	115	102	13	75	136
95th Queue (ft)	219	99	58	65	56	36	149	229	209	38	191	288
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	1				0			0				
Queuing Penalty (veh)	0				0			0				

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	222	284	70	114	274	196	57	50	64	74
Average Queue (ft)	81	130	35	55	128	74	23	16	16	27
95th Queue (ft)	151	231	61	100	229	149	54	43	48	57
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	0	7			2					
Queuing Penalty (veh)	1	9			2					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	147	150	165	69	202	264	247	80	155	138	80	105
Average Queue (ft)	75	69	70	20	35	150	119	30	71	65	30	52
95th Queue (ft)	137	131	139	51	106	244	203	64	130	118	68	89
Link Distance (ft)			582	582		1686			1672			732
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)							18					
Queuing Penalty (veh)							86					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	355	121
Average Queue (ft)	145	44
95th Queue (ft)	287	94
Link Distance (ft)	732	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		480
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	270	55	47	189	36	39	47
Average Queue (ft)	121	22	13	99	11	11	11
95th Queue (ft)	212	53	37	166	34	35	36
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					200		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	68	38	97	97	39	104	87	29	52	97	236	18
Average Queue (ft)	23	9	38	39	10	40	27	2	17	16	62	2
95th Queue (ft)	53	27	80	73	31	88	68	14	42	57	156	12
Link Distance (ft)	237	237	1254			732	732			818	818	818
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				170	200			160	250			
Storage Blk Time (%)												
Queuing Penalty (veh)												

Zone Summary

Zone wide Queuing Penalty: 98

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	278	121	124	171	171	92	207	383	342	82	330	391
Average Queue (ft)	145	36	52	83	66	25	99	214	153	28	160	221
95th Queue (ft)	250	88	93	147	137	62	178	362	303	62	279	344
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	2			7	2			2				
Queuing Penalty (veh)	1			8	3			5				

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	146	191	98	209	210	222	209	98	92	157
Average Queue (ft)	77	84	48	90	85	86	102	50	39	59
95th Queue (ft)	126	157	88	164	171	172	175	84	77	115
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	0	2		0	0					
Queuing Penalty (veh)	2	4		0	0					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	259	233	350	117	207	433	352	144	277	283	126	132
Average Queue (ft)	164	141	190	43	73	223	147	79	186	179	62	74
95th Queue (ft)	243	210	315	86	169	358	269	136	272	268	107	116
Link Distance (ft)			582	582		1686			1673			732
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)					1	35						
Queuing Penalty (veh)					10	153						

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	466	180
Average Queue (ft)	292	69
95th Queue (ft)	430	139
Link Distance (ft)	732	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		480
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	276	119	42	191	128	60	56
Average Queue (ft)	112	32	13	89	51	20	18
95th Queue (ft)	232	80	35	162	104	50	47
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					200		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	110	68	86	75	62	224	182	35	105	147	268	34
Average Queue (ft)	42	20	33	31	27	106	56	7	48	34	99	8
95th Queue (ft)	84	50	68	62	57	197	137	23	87	101	223	24
Link Distance (ft)	237	237	1254			732	732			818	818	818
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				170	200			160	250			
Storage Blk Time (%)						1	0					
Queuing Penalty (veh)						0	0					

Zone Summary

Zone wide Queuing Penalty: 187

Intersection: 8: MD 924 & Plumtree Rd.

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (ft)	309	153	150	195	190	116	209	338	298	69	369	470
Average Queue (ft)	158	31	56	108	74	31	95	159	130	30	160	264
95th Queue (ft)	272	94	105	183	147	72	170	278	244	60	318	433
Link Distance (ft)		771	771		215			818	818		1316	1316
Upstream Blk Time (%)				0	0	0						
Queuing Penalty (veh)				0	0	0						
Storage Bay Dist (ft)	250			120		120	300			500		
Storage Blk Time (%)	3			14	2			0			0	
Queuing Penalty (veh)	1			21	5			1			0	

Intersection: 11: Access/Blue Spruce Dr & Belair South Pkwy

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	246	279	180	224	213	246	210	100	124	100
Average Queue (ft)	127	98	77	100	97	107	93	53	50	54
95th Queue (ft)	233	216	145	178	184	206	161	85	97	88
Link Distance (ft)		572	572		582	582	470	470	879	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			240						350
Storage Blk Time (%)	9	1		0	0					
Queuing Penalty (veh)	21	4		1	0					

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	L	T	R	L	T	R	L	T	TR	L	L
Maximum Queue (ft)	226	221	293	152	229	359	171	167	248	246	111	229
Average Queue (ft)	142	131	168	52	52	201	88	68	136	139	55	71
95th Queue (ft)	211	198	269	110	147	323	143	126	214	222	97	160
Link Distance (ft)			582	582		1686			1673			732
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	500	500			130		485	500		500	350	
Storage Blk Time (%)					1	31						
Queuing Penalty (veh)					3	98						

Intersection: 12: MD 924 & Belair South Pkwy/Laurel Bush Rd.

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	571	273
Average Queue (ft)	320	88
95th Queue (ft)	475	187
Link Distance (ft)	732	
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)		480
Storage Blk Time (%)	1	
Queuing Penalty (veh)	5	

Intersection: 19: Blue Spruce Dr/Access & Plumtree Rd.

Movement	EB	EB	WB	WB	NB	NB	SB
Directions Served	LT	R	L	TR	LT	R	LTR
Maximum Queue (ft)	202	93	56	173	116	60	51
Average Queue (ft)	66	29	18	77	48	22	19
95th Queue (ft)	158	67	44	140	92	50	46
Link Distance (ft)	712	712	771	771	599		277
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)					200		
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 20: MD 924 & Bright Oaks Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	124	90	118	62	84	181	187	38	138	346	531	40
Average Queue (ft)	56	30	51	23	38	90	66	8	39	49	179	10
95th Queue (ft)	107	68	94	49	73	166	136	25	95	179	389	29
Link Distance (ft)	237	237	1254			732	732			818	818	818
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)				170	200			160	250			
Storage Blk Time (%)			0			0	0			0		
Queuing Penalty (veh)			0			0	0			0		

Zone Summary

Zone wide Queuing Penalty: 160

Analyses for Site Access Points along Blue Spruce Drive
(Scenario: Right-in/Right-out on MD 924)





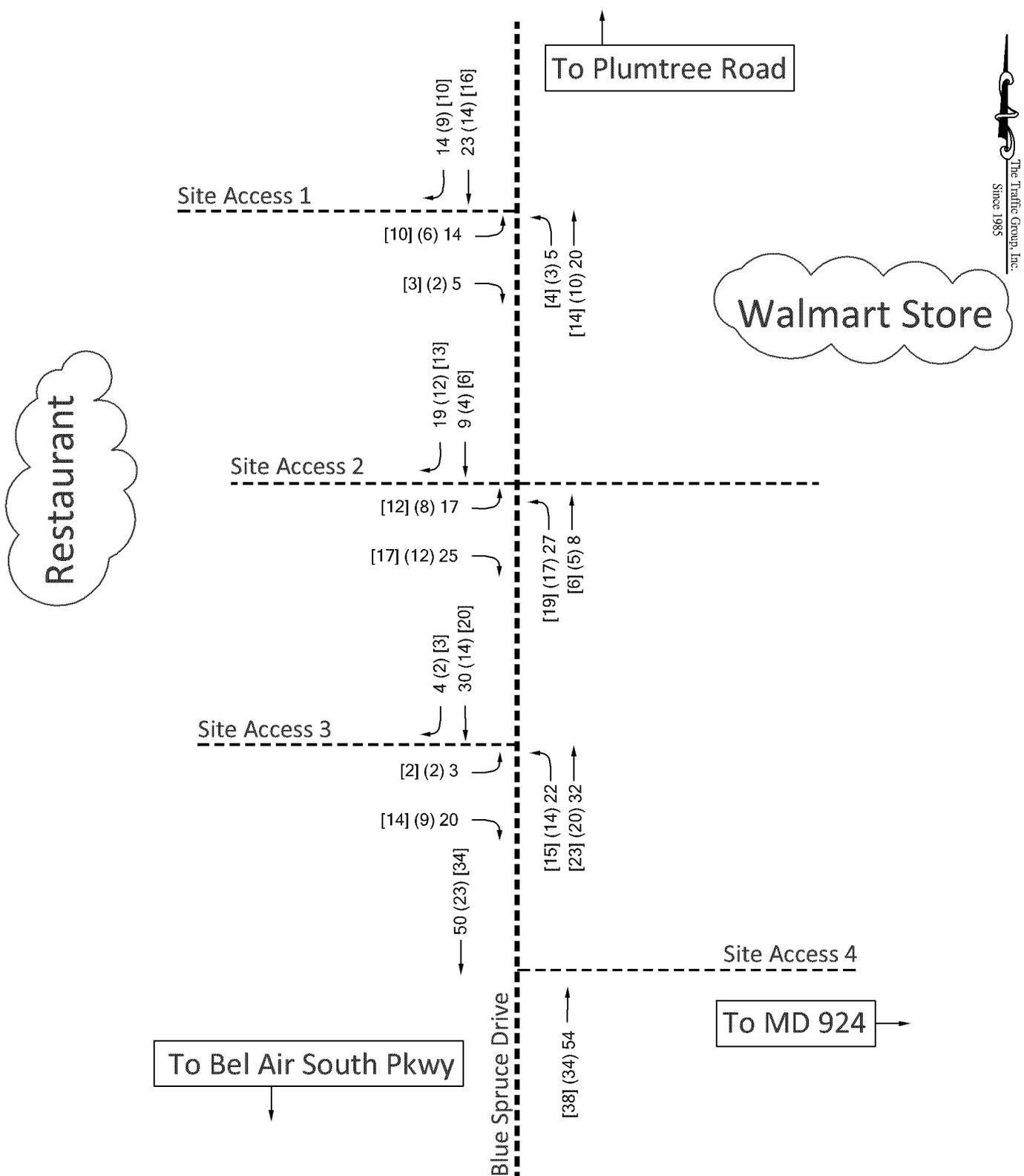
Note: Trip assignment is based on overall trip assignment with RI/RO access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1A
TRIP ASSIGNMENT FOR
SUBJECT SITE - WAL MART



Note: Trip assignment is based on overall trip assignment with RI/RO access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1B
TRIP ASSIGNMENT FOR
SUBJECT SITE - RESTAURANT



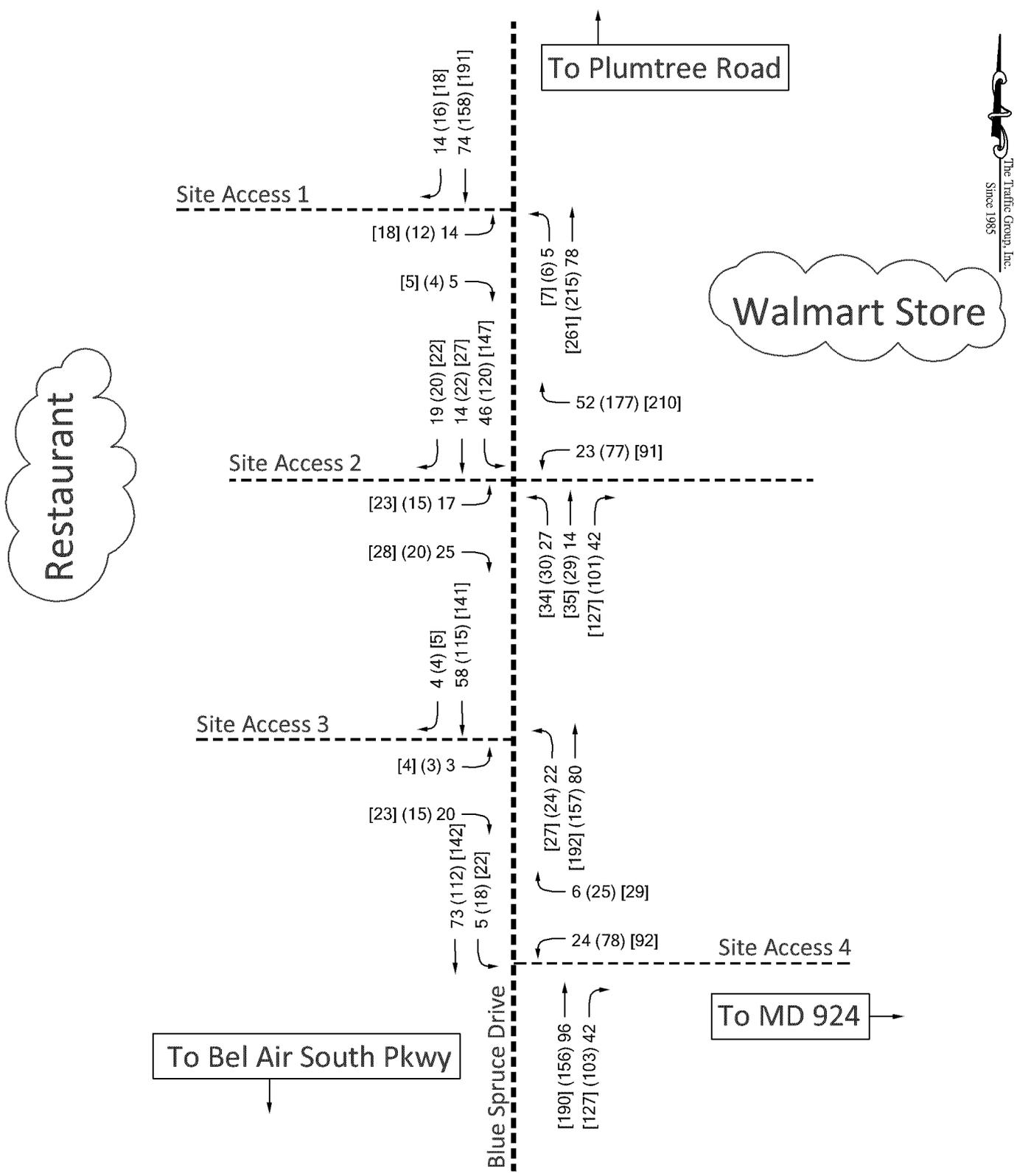
Note: Trip assignment is based on overall trip assignment with RI/RO access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1C
PASS-BY TRIP ASSIGNMENT
FOR SUBJECT SITE



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 2
TOTAL PEAK HOUR
TRAFFIC VOLUMES

Scenario: Right-in/Right-out at MD 924

		Morning Peak Hour Traffic	Evening Peak Hour Traffic	Midday Saturday Peak Hour Traffic
HCS Analysis				
2015 Total Traffic	Control Type	LOS / DELAY (sec.)	LOS / DELAY (sec.)	LOS / DELAY (sec.)
1. Blue Spruce Drive & Site Access 1	Stop Sign			
Eastbound Site Access 1 approach:		A / 9.4	B / 10.9	B / 11.7
Northbound Blue Spruce Drive approach:		A / 7.4	A / 7.6	A / 7.7
2. Blue Spruce Drive & Site Access 2	Stop Sign			
Eastbound Site Access 2 approach:		A / 9.8	B / 12.5	B / 14.7
Westbound Site Access 2 approach:		A / 9.6	B / 13.0	C / 16.3
Northbound Blue Spruce Drive approach:		A / 7.3	A / 7.3	A / 7.4
Southbound Blue Spruce Drive approach:		A / 7.4	A / 7.7	A / 7.9
3. Blue Spruce Drive & Site Access 3	Stop Sign			
Eastbound Site Access 3 approach:		A / 8.8	A / 9.3	A / 9.5
Northbound Blue Spruce Drive approach:		A / 7.4	A / 7.5	A / 7.6
4. Blue Spruce Drive & Site Access 4	Stop Sign			
Westbound Site Access 4 approach:		A / 9.7	B / 11.6	B / 12.9
Southbound Blue Spruce Drive approach:		A / 7.5	A / 7.8	A / 8.0



**EXHIBIT 3
RESULTS OF INTERSECTION
CAPACITY ANALYSES (HCS)**

To Plumtree Road

Site Access 1

Walmart Store

Restaurant

Site Access 2

Site Access 3

Site Access 4

To Bel Air South Pkwy

To MD 924

Blue Spruce Drive



NOT TO SCALE

EXHIBIT 4
RECOMMENDED
FUTURE LANE USE

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	5	78			74	14		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	5	84	0	0	80	15		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	14		5					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	15	0	5	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	5						20	
C (m) (veh/h)	1499						840	
v/c	0.00						0.02	
95% queue length	0.01						0.07	
Control Delay (s/veh)	7.4						9.4	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.4	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	215			158	16		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	6	233	0	0	171	17		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	12		4					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	13	0	4	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	6						17	
C (m) (veh/h)	1386						631	
v/c	0.00						0.03	
95% queue length	0.01						0.08	
Control Delay (s/veh)	7.6						10.9	
LOS	A						B	
Approach Delay (s/veh)	--	--					10.9	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	7	261			191	18		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	7	283	0	0	207	19		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	18		5					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	19	0	5	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	7						24	
C (m) (veh/h)	1342						561	
v/c	0.01						0.04	
95% queue length	0.02						0.13	
Control Delay (s/veh)	7.7						11.7	
LOS	A						B	
Approach Delay (s/veh)	--	--					11.7	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 2			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	27	14	42	46	14	19		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	29	15	45	49	15	20		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	17	5	25	23	5	52		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	18	5	27	24	5	56		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	29	49		85			50	
C (m) (veh/h)	1576	1556		869			807	
v/c	0.02	0.03		0.10			0.06	
95% queue length	0.06	0.10		0.32			0.20	
Control Delay (s/veh)	7.3	7.4		9.6			9.8	
LOS	A	A		A			A	
Approach Delay (s/veh)	--	--		9.6			9.8	
Approach LOS	--	--		A			A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 2			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	30	29	101	120	22	20		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	32	31	109	130	23	21		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	15	5	20	77	0	177		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	16	5	21	83	0	192		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	32	130		275			42	
C (m) (veh/h)	1564	1443		726			523	
v/c	0.02	0.09		0.38			0.08	
95% queue length	0.06	0.30		1.77			0.26	
Control Delay (s/veh)	7.3	7.7		13.0			12.5	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--		13.0			12.5	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information					
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2				
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD				
Date Performed	3/3/2015	Analysis Year	2015				
Analysis Time Period	Total Sat RIRO on MD 924						
Project Description 2011-0306 Walmart - Bel Air							
East/West Street: Site Acc 2			North/South Street: Blue Spruce Dr				
Intersection Orientation: North-South			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street	Northbound			Southbound			
Movement	1	2	3	4	5	6	
	L	T	R	L	T	R	
Volume (veh/h)	34	35	127	147	27	22	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	36	38	138	159	29	23	
Percent Heavy Vehicles	2	--	--	2	--	--	
Median Type	Undivided						
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street	Eastbound			Westbound			
Movement	7	8	9	10	11	12	
	L	T	R	L	T	R	
Volume (veh/h)	23	5	28	91	5	210	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly Flow Rate, HFR (veh/h)	24	5	30	98	5	228	
Percent Heavy Vehicles	2	2	2	2	2	2	
Percent Grade (%)	0			0			
Flared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
Lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11
						12	
Lane Configuration	LTR	LTR	LTR			LTR	
v (veh/h)	36	159	331			59	
C (m) (veh/h)	1554	1400	646			429	
v/c	0.02	0.11	0.51			0.14	
95% queue length	0.07	0.38	2.93			0.47	
Control Delay (s/veh)	7.4	7.9	16.3			14.7	
LOS	A	A	C			B	
Approach Delay (s/veh)	--	--	16.3			14.7	
Approach LOS	--	--	C			B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	22	80			58	4		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	23	86	0	0	63	4		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	3		20					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	3	0	21	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	23						24	
C (m) (veh/h)	1535						965	
v/c	0.01						0.02	
95% queue length	0.05						0.08	
Control Delay (s/veh)	7.4						8.8	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.8	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	24	157			115	4		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	26	170	0	0	124	4		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	3		15					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	3	0	16	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	26						19	
C (m) (veh/h)	1458						863	
v/c	0.02						0.02	
95% queue length	0.05						0.07	
Control Delay (s/veh)	7.5						9.3	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.3	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	27	192			141	5		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	29	208	0	0	153	5		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	4		23					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	4	0	24	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	29						28	
C (m) (veh/h)	1422						826	
v/c	0.02						0.03	
95% queue length	0.06						0.11	
Control Delay (s/veh)	7.6						9.5	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.5	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD
Date Performed	3/3/2015	Analysis Year	2015
Analysis Time Period	Total AM RIRO on MD 924		

Project Description 2011-0306 Walmart - Bel Air	
East/West Street: Site Acc 4	North/South Street: Blue Spruce Dr
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments						
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		96	42	5	73	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	104	45	5	79	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				24		6
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	0	0	0	26	0	6
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		5		32				
C (m) (veh/h)		1445		800				
v/c		0.00		0.04				
95% queue length		0.01		0.12				
Control Delay (s/veh)		7.5		9.7				
LOS		A		A				
Approach Delay (s/veh)	--	--	9.7					
Approach LOS	--	--	A					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 4			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	156	103	18	112				
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	169	111	19	121	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				78		25		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	84	0	27		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration				LR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		19		111				
C (m) (veh/h)		1294		655				
v/c		0.01		0.17				
95% queue length		0.04		0.61				
Control Delay (s/veh)		7.8		11.6				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.6					
Approach LOS	--	--	B					

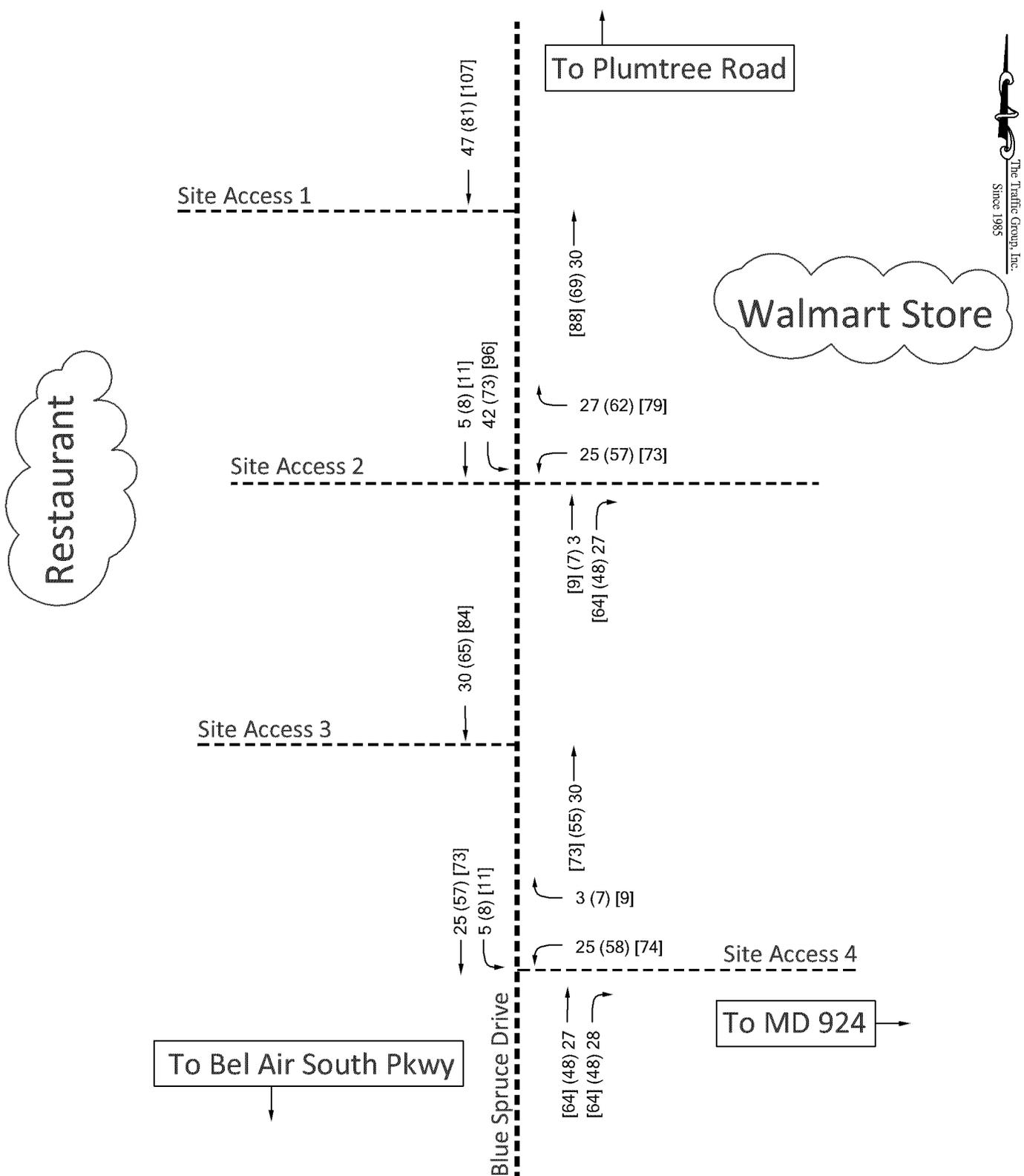
TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat. RIRO on MD 924							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 4			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		190	127	22	142			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	206	138	23	154	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				92		29		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	99	0	31		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration				LR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		23		130				
C (m) (veh/h)		1226		583				
v/c		0.02		0.22				
95% queue length		0.06		0.85				
Control Delay (s/veh)		8.0		12.9				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.9					
Approach LOS	--	--	B					

Analyses for Site Access Points along Blue Spruce Drive

(Scenario: Full Access on MD 924)





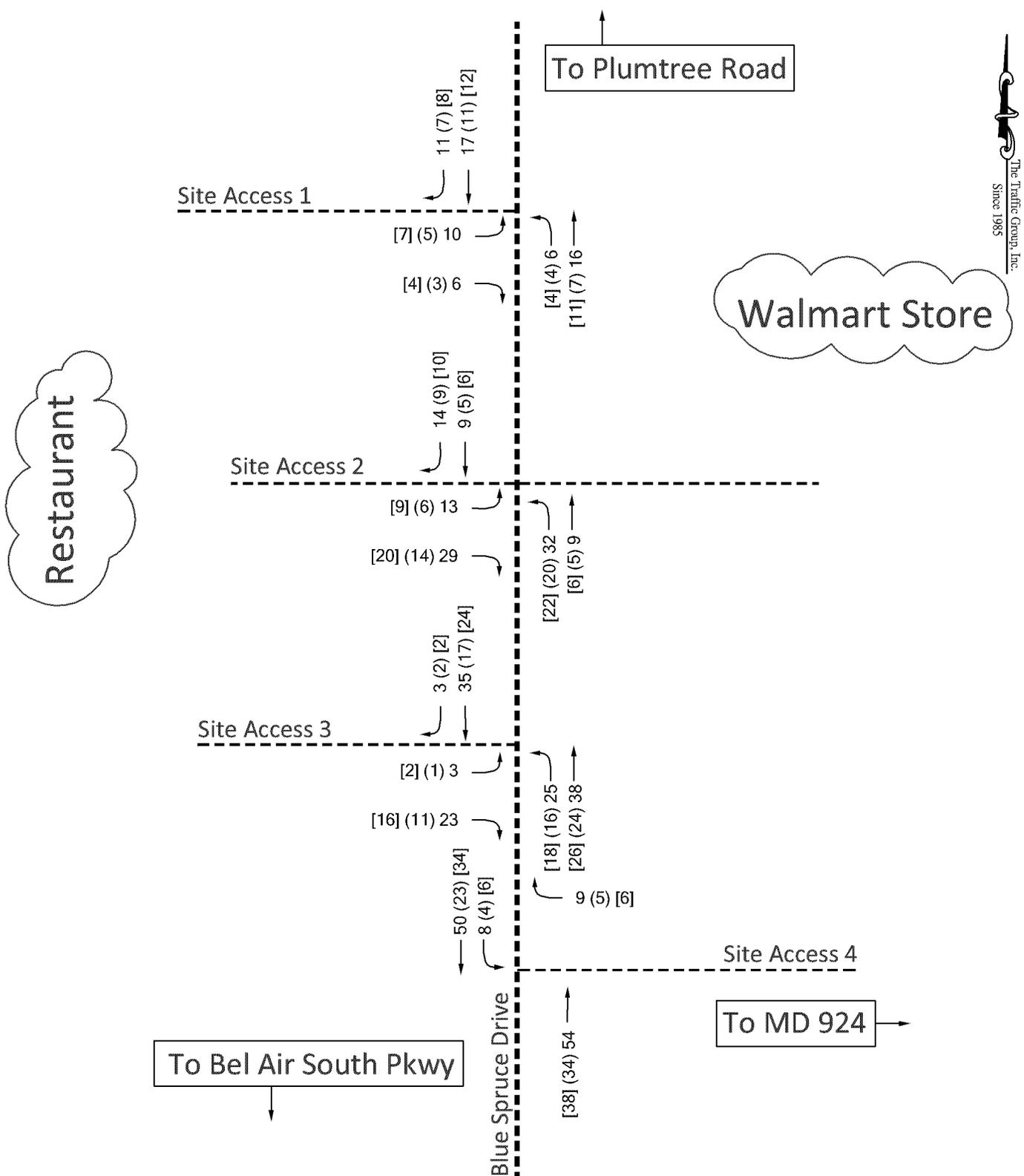
Note: Trip assignment is based on overall trip assignment with full access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1A
TRIP ASSIGNMENT FOR
SUBJECT SITE - WAL M ART



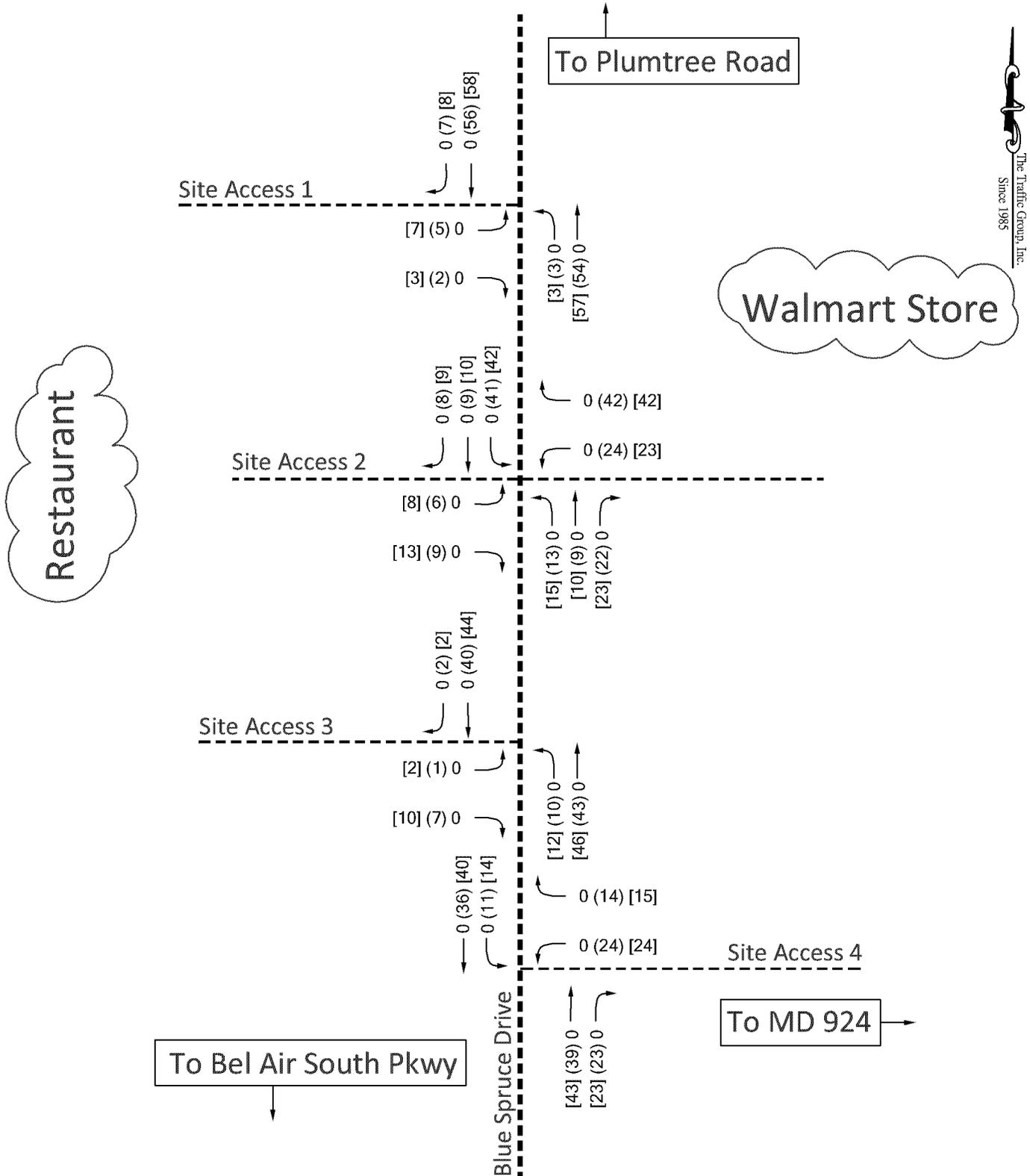
Note: Trip assignment is based on overall trip assignment with full access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1B
TRIP ASSIGNMENT FOR
SUBJECT SITE - RESTAURANT



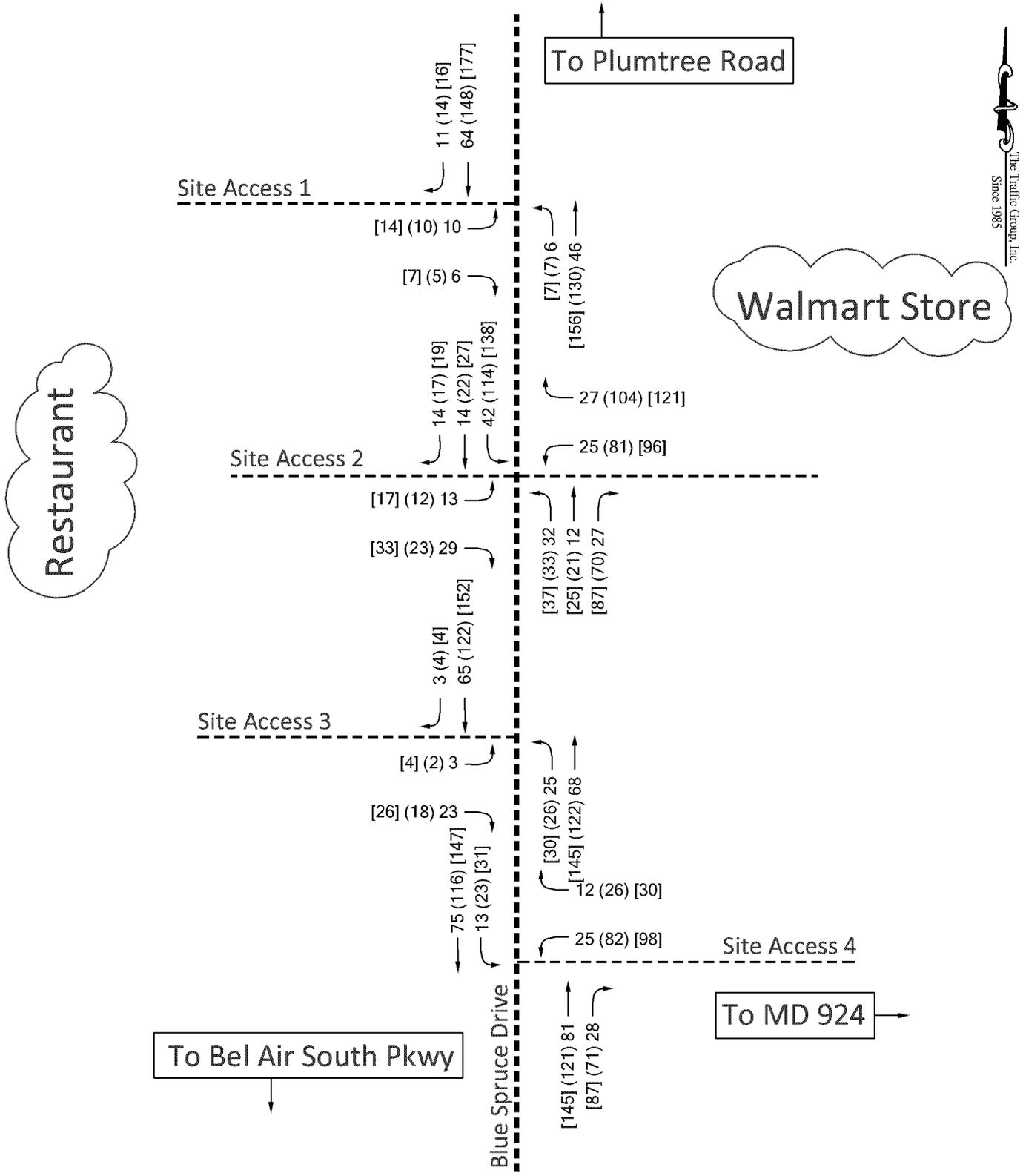
Note: Trip assignment is based on overall trip assignment with full access on MD 924.



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

EXHIBIT 1C
PASS-BY TRIP ASSIGNMENT
FOR SUBJECT SITE



NOT TO SCALE

- 00 - MORNING PEAK HOUR
- (00) - EVENING PEAK HOUR
- [00] - SATURDAY MIDDAY PEAK HOUR

**EXHIBIT 2
TOTAL PEAK HOUR
TRAFFIC VOLUMES**

HCS Analysis

		Morning Peak Hour Traffic	Evening Peak Hour Traffic	Midday Saturday Peak Hour Traffic
		LOS / DELAY (sec.)	LOS / DELAY (sec.)	LOS / DELAY (sec.)
2015 Total Traffic				
1. Blue Spruce Drive & Site Access 1	Stop Sign			
Eastbound Site Access 1 approach:		A / 9.1	B / 10.1	B / 10.5
Northbound Blue Spruce Drive approach:		A / 7.4	A / 7.6	A / 7.7
2. Blue Spruce Drive & Site Access 2	Stop Sign			
Eastbound Site Access 2 approach:		A / 9.4	B / 11.0	B / 11.9
Westbound Site Access 2 approach:		A / 9.8	B / 12.5	B / 14.9
Northbound Blue Spruce Drive approach:		A / 7.3	A / 7.3	A / 7.4
Southbound Blue Spruce Drive approach:		A / 7.3	A / 7.6	A / 7.7
3. Blue Spruce Drive & Site Access 3	Stop Sign			
Eastbound Site Access 3 approach:		A / 8.9	A / 9.2	A / 9.5
Northbound Blue Spruce Drive approach:		A / 7.4	A / 7.5	A / 7.6
4. Blue Spruce Drive & Site Access 4	Stop Sign			
Westbound Site Access 4 approach:		A / 9.6	B / 11.3	B / 12.5
Southbound Blue Spruce Drive approach:		A / 7.4	A / 7.7	A / 7.8



**EXHIBIT 3
RESULTS OF INTERSECTION
CAPACITY ANALYSES (HCS)**

To Plumtree Road

Site Access 1

Walmart Store

Restaurant

Site Access 2

Site Access 3

Site Access 4

To Bel Air South Pkwy

To MD 924

Blue Spruce Drive

NOT TO SCALE



EXHIBIT 4
RECOMMENDED
FUTURE LANE USE

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	6	46			64	11		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	6	49	0	0	69	11		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		6					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	0	6	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	6						16	
C (m) (veh/h)	1518						901	
v/c	0.00						0.02	
95% queue length	0.01						0.05	
Control Delay (s/veh)	7.4						9.1	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.1	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	7	130			148	14		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	7	141	0	0	160	15		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	10		5					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	10	0	5	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	7						15	
C (m) (veh/h)	1401						725	
v/c	0.00						0.02	
95% queue length	0.02						0.06	
Control Delay (s/veh)	7.6						10.1	
LOS	A						B	
Approach Delay (s/veh)	--	--					10.1	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 1					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 1			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	7	156			177	16		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	7	169	0	0	192	17		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	14		7					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	15	0	7	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	7						22	
C (m) (veh/h)	1362						674	
v/c	0.01						0.03	
95% queue length	0.02						0.10	
Control Delay (s/veh)	7.7						10.5	
LOS	A						B	
Approach Delay (s/veh)	--	--					10.5	
Approach LOS	--	--					B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 2			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	32	12	27	42	14	14		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	34	13	29	45	15	15		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	13	5	29	25	5	27		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	14	5	31	27	5	29		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	34	45		61			50	
C (m) (veh/h)	1583	1580		810			866	
v/c	0.02	0.03		0.08			0.06	
95% queue length	0.07	0.09		0.24			0.18	
Control Delay (s/veh)	7.3	7.3		9.8			9.4	
LOS	A	A		A			A	
Approach Delay (s/veh)	--	--		9.8			9.4	
Approach LOS	--	--		A			A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD
Date Performed	3/3/2015	Analysis Year	2015
Analysis Time Period	Total PM		

Project Description: 2011-0306 Walmart - Bel Air	
East/West Street: Site Acc 2	North/South Street: Blue Spruce Dr
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	33	21	70	114	22	17
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	35	22	76	123	23	18
Percent Heavy Vehicles	2	--	--	2	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	12	5	23	81	0	104
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR (veh/h)	13	5	24	88	0	113
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound			
Movement	1	4	7	8	9	10	11	12	
Lane Configuration	LTR	LTR		LTR			LTR		
v (veh/h)	35	123		201			42		
C (m) (veh/h)	1568	1495		682			642		
v/c	0.02	0.08		0.29			0.07		
95% queue length	0.07	0.27		1.23			0.21		
Control Delay (s/veh)	7.3	7.6		12.5			11.0		
LOS	A	A		B			B		
Approach Delay (s/veh)	--	--		12.5			11.0		
Approach LOS	--	--		B			B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 2					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 2			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	37	25	87	138	27	19		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	40	27	94	149	29	20		
Percent Heavy Vehicles	2	--	--	2	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LTR			LTR				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	17	5	33	96	5	121		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	18	5	35	104	5	131		
Percent Heavy Vehicles	2	2	2	2	2	2		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration		LTR			LTR			
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	40	149		240			58	
C (m) (veh/h)	1558	1467		601			583	
v/c	0.03	0.10		0.40			0.10	
95% queue length	0.08	0.34		1.91			0.33	
Control Delay (s/veh)	7.4	7.7		14.9			11.9	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--		14.9			11.9	
Approach LOS	--	--		B			B	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	25	68			65	3		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	27	73	0	0	70	3		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	3		23					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	3	0	24	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	27						27	
C (m) (veh/h)	1527						961	
v/c	0.02						0.03	
95% queue length	0.05						0.09	
Control Delay (s/veh)	7.4						8.9	
LOS	A						A	
Approach Delay (s/veh)	--	--					8.9	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	26	122			122	4		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	28	132	0	0	132	4		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	2	18						
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	2	0	19	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	28						21	
C (m) (veh/h)	1448						882	
v/c	0.02						0.02	
95% queue length	0.06						0.07	
Control Delay (s/veh)	7.5						9.2	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.2	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 3					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 3			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)	30	145			152	4		
Peak-Hour Factor, PHF	0.92	0.92	1.00	1.00	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	32	157	0	0	165	4		
Percent Heavy Vehicles	2	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration	LT					TR		
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)	4		26					
Peak-Hour Factor, PHF	0.92	1.00	0.92	1.00	1.00	1.00		
Hourly Flow Rate, HFR (veh/h)	4	0	28	0	0	0		
Percent Heavy Vehicles	2	0	2	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration		LR						
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (veh/h)	32						32	
C (m) (veh/h)	1409						830	
v/c	0.02						0.04	
95% queue length	0.07						0.12	
Control Delay (s/veh)	7.6						9.5	
LOS	A						A	
Approach Delay (s/veh)	--	--					9.5	
Approach LOS	--	--					A	

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total AM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 4			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		81	28	13	75			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	88	30	14	81	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				25		12		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	27	0	13		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration				LR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		14		40				
C (m) (veh/h)		1483		825				
v/c		0.01		0.05				
95% queue length		0.03		0.15				
Control Delay (s/veh)		7.5		9.6				
LOS		A		A				
Approach Delay (s/veh)	--	--	9.6					
Approach LOS	--	--	A					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total PM							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 4			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		121	71	23	116			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	131	77	24	126	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				82		26		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	89	0	28		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration				LR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		24		117				
C (m) (veh/h)		1375		690				
v/c		0.02		0.17				
95% queue length		0.05		0.61				
Control Delay (s/veh)		7.7		11.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.3					
Approach LOS	--	--	B					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information						
Analyst	QT	Intersection	Blue Spruce Dr & Site Acc 4					
Agency/Co.	TTG, Inc.	Jurisdiction	Harford, MD					
Date Performed	3/3/2015	Analysis Year	2015					
Analysis Time Period	Total Sat.							
Project Description 2011-0306 Walmart - Bel Air								
East/West Street: Site Acc 4			North/South Street: Blue Spruce Dr					
Intersection Orientation: North-South			Study Period (hrs): 0.25					
Vehicle Volumes and Adjustments								
Major Street	Northbound			Southbound				
Movement	1	2	3	4	5	6		
	L	T	R	L	T	R		
Volume (veh/h)		145	87	31	147			
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	157	94	33	159	0		
Percent Heavy Vehicles	0	--	--	0	--	--		
Median Type	Undivided							
RT Channelized			0			0		
Lanes	0	1	0	0	1	0		
Configuration			TR	LT				
Upstream Signal		0			0			
Minor Street	Eastbound			Westbound				
Movement	7	8	9	10	11	12		
	L	T	R	L	T	R		
Volume (veh/h)				98		30		
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92		
Hourly Flow Rate, HFR (veh/h)	0	0	0	106	0	32		
Percent Heavy Vehicles	0	0	0	0	0	0		
Percent Grade (%)	0			0				
Flared Approach		N			N			
Storage		0			0			
RT Channelized			0			0		
Lanes	0	0	0	0	0	0		
Configuration				LR				
Delay, Queue Length, and Level of Service								
Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		33		138				
C (m) (veh/h)		1326		618				
v/c		0.02		0.22				
95% queue length		0.08		0.85				
Control Delay (s/veh)		7.8		12.5				
LOS		A		B				
Approach Delay (s/veh)	--	--	12.5					
Approach LOS	--	--	B					